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and Labour Markets : The Case of Malaysia*
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This thesis starts by critically assessing human capital theory in the study of education and labour markets. It is argued that, while revealing the statistical significance of factors like ethnicity in education and labour markets, it does not help us to understand how education is provided and how labour markets are structured. The reason for this is that it leaves aside the historical and institutional contexts from the analysis, so that the question of why factors like ethnicity gain significance in education and labour markets cannot be addressed appropriately. These fundamental flaws undermine the relevance of human capital theory in the study of higher education and labour markets, and they are indeed compounded in the empirical application to the Malaysian case. Rather than applying the theory or remedying its analytical deficiencies, therefore, this thesis breaks with it and instead adopts a political economy approach that places the role of government at the analytical centre.

Being a multi-ethnic country, Malaysia's higher education and labour market policies reflect the trade-off between equity, or inter-ethnic distribution, and efficiency, or economic growth. The main purpose for this is to maintain social stability by lifting up the socio-economic status of Malays whilst increasing the economic pie to distribute. The New Economic Policy set the institutional foundation on which these policies are introduced and implemented. Access to higher education and provision of higher educational services are institutionally arranged in favour of Malays, and the public sector is geared towards employing them. Empirical analysis of the Population and Housing Census Malaysia 2000 points to ethnic differentials in access to higher education and sector selection in labour markets. It is also found that the ethnic factor persists from higher education through to labour markets, implying that the decisions of higher education enrolment and sector selection are made simultaneously.

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The Political Economy of Higher Education and Labour Markets: The Case of Malaysia

Akihito Aihara

July 2009

**This thesis is submitted in fulfilment of the requirement
for the degree of PhD in Economics**

**Department of Economics
School of Oriental and African Studies
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Akihito Aihara

ABSTRACT

This thesis starts by critically assessing human capital theory in the study of education and labour markets. It is argued that, while revealing the statistical significance of factors like ethnicity in education and labour markets, it does not help us to understand how education is provided and how labour markets are structured. The reason for this is that it leaves aside the historical and institutional contexts from the analysis, so that the question of why factors like ethnicity gain significance in education and labour markets cannot be addressed appropriately. These fundamental flaws undermine the relevance of human capital theory in the study of higher education and labour markets, and they are indeed compounded in the empirical application to the Malaysian case. Rather than applying the theory or remedying its analytical deficiencies, therefore, this thesis breaks with it and instead adopts a political economy approach that places the role of government at the analytical centre.

Being a multi-ethnic country, Malaysia's higher education and labour market policies reflect the trade-off between equity, or inter-ethnic distribution, and efficiency, or economic growth. The main purpose for this is to maintain social stability by lifting up the socio-economic status of Malays whilst increasing the economic pie to distribute. The New Economic Policy set the institutional foundation on which these policies are introduced and implemented. Access to higher education and provision of higher educational services are institutionally arranged in favour of Malays, and the public sector is geared towards employing them. Empirical analysis of the Population and Housing Census Malaysia 2000 points to ethnic differentials in access to higher education and sector selection in labour markets. It is also found that the ethnic factor persists from higher education through to labour markets, implying that the decisions of higher education enrolment and sector selection are made simultaneously.

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ABBREVIATION

ADB	Asian Development Bank
BLUE	Best Linear Unbiased
BN	Barisan Nasional (National Front)
CUEPACS	Congress of Union of Employees in the Public and Civil Service, Malaysia
DAP	Democratic Action Party, Malaysia
DOS	Department of Statistics, Malaysia
EPF	Employees Provident Fund, Malaysia
EPU	Economic Planning Unit, Malaysia
FIML	Full Information Maximum Likelihood
FTZ	Free Trade Zone
GDP	Gross Domestic Product
HES	Household Expenditure Survey, Malaysia
HLT	Heckman, Lochnar and Todd (2003)
HRDC	The Human Resource Development Council, Malaysia
HRDF	The Human Resource Development Fund, Malaysia
ICA	Industrial Coordination Act, Malaysia
IIA	Independence from Irrelevant Alternatives
INTAN	Institut Tadbiran Awam Negara (The National Public Administration Institute, Malaysia)
IPA	Investment Promotion Act, Malaysia
IQ	Intelligence Quotient
IRA	Industrial Relations Act, Malaysia
KL	Kuala Lumpur
LFP	Labour Force Participation
LMW	Licensed Manufacturing Warehouse
MCA	Malaysian Chinese Association
MES	Migration and Employment Survey, Malaysia

MEXS	Malaysian Expenditure Survey, Malaysia
MFLS-1	First Malaysian Family Life Survey
MFLS-2	Second Malaysian Family Life Survey
MHIS	Malaysian Household Income Survey
MHS	Malaysian Household Survey
MIT	MARA Institute of Technology, Malaysia
MLO	Malaysian Labour Organization
MNL	Multinomial Logit
MSES	Malaysia Socio-Economic Sample
MTUC	Malaysian Trade Union Congress (formerly Malaysian Trade Union Council)
NABA	National Accreditation Board Act, Malaysia
NDP	National Development Policy (1991-2000)
NEP	New Economic Policy (1971-1990)
NOC	National Operations Council
NRS	New Remuneration Scheme, Malaysia
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
PES	Post-Enumeration Survey, Malaysia
PHEIA	Private Higher Educational Institutions Act, Malaysia
PAS	Parti Islam Se-Malaysia (Pan-Malaysia Islamic Party)
PMR	Penilaian Mengah Rendah (Lower Secondary Assessment, Malaysia)
PTD	Pegawai Tadbir dan Diplomati (Diplomatic and Administrative Officer, Malaysia)
RAND	Research AND Development
RM	Ringgit Malaysia
ROR	Rate-of-Return
SOCISO	The Social Security Organization, Malaysia
SPM	Sijil Pelajaran Malaysia (Malaysia Certificate of Education)
STPM	Sijil Tinggi Pelajaran Malaysia (Malaysia Higher School Certificate)
TARC	Tunku Abdul Rahman College, Malaysia
TUO	Trade Union Ordinance, Malaysia
UIA	Universiti Islam Antarabangsa (International Islamic University of Malaysia)
UKM	Universiti Kebangsaan Malaysia (The National University of Malaysia)
UM	Universiti Malaya (The University of Malaya)
UMNO	United Malays National Organization
UNESCO	The United Nations Educational, Scientific and Cultural Organization
UPU	Unit Pusat Universiti (The Central University Admissions Unit, Malaysia)
UPM	Universiti Putra Malaysia (The Putra University of Malaysia)
USM	Universiti Sains Malaysia (The Science University of Malaysia)
UTM	Universiti Teknologi Malaysia (The Technology University of Malaysia)
UUCA	The University and Universities Colleges Act (Malaysia)
UUM	Universiti Utara Malaysia (The Northern University of Malaysia)
WEI	World Education Indicators

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Perhaps, it may be odd for many people that I chose Malaysia as the subject country of this research. To explain this, let me set back the clock to early 1997. I spoke to my grandfather, Kiyoshi Takahashi, over the phone, and asked him which country in Southeast Asia could be particularly interesting to study at university. His reply was lightning-quick, and he mentioned the multi-ethnic country, which has been resource-rich and maintained close political-economic

relationship with my country, Japan. In this sense, the origin of my journey can be traced back to him, and more-than-a-decade-long experience with Malaysia is, though perhaps temporarily, going to end with this piece.

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Chapter 1

Introduction: Contextual Backgrounds

Investment in human capital is deemed crucial in enhancing economic development by many researchers and practitioners. The economic success of some East Asian economies has drawn attention from scholarly and research fields (for example, World Bank 1993). They attempted to investigate sources of such miraculous growth, and their principal research questions have been whether education contributes to spurring economic growth and to what extent it does so. In the light of this, economic growth theory has developed through the use of sophisticated mathematical modelling. Endogenous growth theory flourished and yielded many regression works (for example, Barro 1991; Sala-i-Martin 1994, 1997). Lucas (1988) theoretically incorporated the role of human capital in an endogenous growth model.¹

The role of higher educational backgrounds in developing countries has been stressed internationally (for example, World Bank 2000). For developed countries, OECD (2003) points to the important role of higher education qualifications for younger workers to earn more over the life cycle. In the context of Asia, ADB (2003) argues that more education, particularly higher education qualifications, matters for preparing a young labour force in the knowledge-based world.

Malaysia is not an exception. In 1991, the government announced Vision 2020, which aims at achieving a fully developed nation status by 2020 (Mahathir 1991). While expanding higher level of education over the 1990s, the government introduced the “Knowledge-based Economy Master Plan” in 2003, and stressed the importance of higher education in achieving this end.² In addition, the most recent five-year plan, namely 9th Malaysia Plan, reserves a chapter for human

¹ See Fine (2000) for a critique of endogenous growth theory.

² <http://www.epu.jpm.my/New%20Folder/publication/knoweco.htm> (last accessed on 21 January 2009).

capital development, and highlights the roles human capital plays in furthering economic development (Malaysia 2006).

1.1 Malaysia in Brief Retrospect

Malaysia is a multi-ethnic country with Malays as the majority group. As of 2005, the population composition was as follows: Bumiputeras (or the sons of the soil) accounted for 65.9 percent of the total population (Malays 54.1 percent and other Bumiputeras 11.8 percent), and Chinese and Indians 25.3 and 7.5 percent, respectively (Swee-Hock 2007, Table 5.2).³ The origin of the multiethnic society can be traced back to the British colonial period from the nineteenth century until the mid-twentieth century. During this period, there were a large number of Chinese and Indians immigrants to Malaysia. In the nineteenth century, various factors in the southern part of the mainland China, such as poverty, land shortage and population pressure, prompted a large number of Chinese people to emigrate. Consequently, some of them, though large in absolute number, migrated to Malaysia and then successfully made the inroads into tin mining and commerce (see Andaya and Andaya 1982; Ching-hwang 2000). They became the source of labour supply in the tin mining sector owned by Europeans, while serving as the middlemen for the British in trade and insurance businesses (see Jesudason 1989; Purcell 1967). By contrast, the Indian migration was driven by the British policy. In order to fill in the labour shortage in the rubber plantation ventures, Indian immigrants were brought from the Indian subcontinent, especially its southern part (see Ramachandran 1994). Many Indians remained in rubber estates since then, but some became financiers and professional men (see Zainudin and Zulkifly 1982). Above all, it can be surmised that the diverse ways in which Chinese and Indians had arrived at Malaysia had some implications on their employment status.

Under the British colonial policy, tin mines and rubber plantation sites were concentrated in the western part of the Peninsular, not only due to production reasons but due to transportation and export reasons. Consequently, it led to spatial difference in terms of infrastructure and industrial development (see

³ The rest are non-Malaysian citizens.

Brookfield 1994). Naturally, they had influences on labour market structures. While many Chinese were found in urban and tin-mining areas and many Indians were in rubber estates, most Malays were concentrated in rural areas by engaging in subsistence peasant sector. According to Lim (1973, p. 53), "in 1947 about 70 per cent of the peasant producers and 88 per cent of the rice growers were Malays. The mining and the manufacturing, construction and utilities sectors were dominated by the Chinese." Though the majority of Malays had resided in rural agricultural sector, there were some Malay elites working in the colonial government office (see Jesdason 1989; Zainudin and Zulkifly 1982).

The situation did not fundamentally change after the country's Independence in 1957. The post-Independence period up to 1969 was characterised by little government intervention in the economy (Alavi 1997; Jomo and Edwards 1993). The private sector development was driven primarily by foreign capital, perpetuating the fundamental structure of employment by ethnicity (see Jesdason 1989). It was especially so because the job creation capacity of the Malaysian economy was constrained by export instability of products such as tin and rubber (see Lim 1973). Consequently, this had substantial effects on the inter-ethnic income distribution, which was reported to have worsened since Independence (Hashim 1997; Jomo and Ishak 1986; Snodgrass 1975). In addition, the mean income of Malay households was 140 (in Malaysian Ringgit) in 1957/58 and 177 in 1970, whereas the mean income of Chinese households was 302 in 1957/58 and 399 in 1970 and that of Indian households was 243 and 310 respectively (Jomo and Ishak 1986, Table 2). This led to a series of political calls for government intervention in various quarters of the society. For example, the Bumiputera Economic Conference was organised by Malay politicians in both 1965 and 1967, strongly requesting government intervention to rectify the inter-ethnic socio-economic imbalances (Means 1976, 1991). Apparently, there was a growing fear that most of the new capitalists in Malaysia would be Chinese (see Puthuchearry 1960; Wheelwright 1965).

The racial riots in 1969 marked the dramatic shift in terms of government intervention. To rectify the inter-ethnic socio-economic imbalances, which were structural issues arising from the past and judged to be the root cause of the riots,

the government was in 1971 empowered to intervene in various aspects of the society (Faaland, Parkinson and Saniman 1991, pp. 12-3). Here, the main focus of government intervention is to bring up the socio-economic position of Malays relative to non-Malays, especially Chinese. Obviously, this means that the socio-economic success of Chinese and Indians is strongly influenced by government policy. Furthermore, it can be surmised from the above discussion that many Indians were, in socio-economic terms, disadvantaged relative to Chinese who had established some commercial success during the post-Independence period. Indeed, as empirically confirmed later in this research, the influences of government policy on labour market outcome differ not only between Malays and non-Malays (Chinese and Indians) but between Chinese and Indians.

As elaborated later in this research, the main areas in which the government has intervened were (higher) education and labour markets. For the ultimate purpose of maintaining social stability in the multiethnic country, the government has introduced various instruments in higher education and played a central role in providing employment opportunities for Malays. In parallel, the government also needs to make sure that the private sector increases the economic pie to distribute for inter-ethnic reasons. In this sense, high economic growth has been required, and a large amount of public funds have been invested for higher education in order to supply educated labour.

1.2 Higher Education Investment in Malaysia

Malaysia has achieved high Gross Domestic Product (GDP) growth rates (see Table 1.1). Its annual GDP growth rate averaged 7.9 percent between 1970 and 1980, 5.3 percent between 1980 and 1990, 7.0 percent between 1990 and 2000, and 4.8 percent between 2000 and 2004. This growth experience stands out even in comparison with the rest of the world. As Table 1.1 shows, Malaysia's growth record is remarkable, surpassing the average GDP growth rates of low, middle and high income countries. Consequently, the country's GDP increased more than twenty-fold from 1970 onwards, and the well-known *East Asia's Miracle*

report of the World Bank included Malaysia as one of the high growth economies (World Bank 1993).⁴

Table 1.1 Annual GDP growth rate (%), 1970-2004

	1970-1980	1980-1990	1990-2000	2000-2004
Malaysia	7.9	5.3	7.0	4.8
Low/Medium Income Countries	5.2	2.8	3.6	4.6
High income countries	3.2	3.2	2.4	2.0

Source: World Bank, *World Development Report*, various issues.

Malaysia has highlighted the role of higher education in promoting economic development. As seen shortly, the government has spent a large amount of public funds by international standards. For analytical convenience and data availability, Figure 1.1 follows UNESCO (2003), and looks at both OECD countries and the participant countries in the World Education Indicators (WEI) programme launched by UNESCO and OECD with the financial support of the World Bank.⁵ Two important facts immediately emerge. First, Malaysia is above the plotted average line, suggesting that the scale of public expenditure on education is larger than is predicted by the average of countries of the same real per capita GDP level. Second, surprisingly, Malaysia spent a larger share of GDP for education than do countries such as US, Japan, South Korea, Brazil, Thailand, Philippines, Indonesia, China and India.

Malaysia's fiscal commitment to education becomes more profound when looking at public expenditure on education as a percentage of total public expenditure. In 1999, Malaysia spent 25.2 percent of the total government expenditure for education, and, among these countries, it ranked second after

⁴ GDP (in millions dollars) increased from 4,200 in 1970 (World Bank 1995, Table 3) to 89,321 in 2000 (World Bank 2002, Table 3).

⁵ OECD countries include Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea (Republic of), Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States. WEI countries are Argentina, Brazil, Chile, China, India, Indonesia, Jamaica, Jordan, Malaysia, Paraguay, Peru, Philippines, Russian Federation, Thailand, Tunisia, Uruguay, and Zimbabwe.

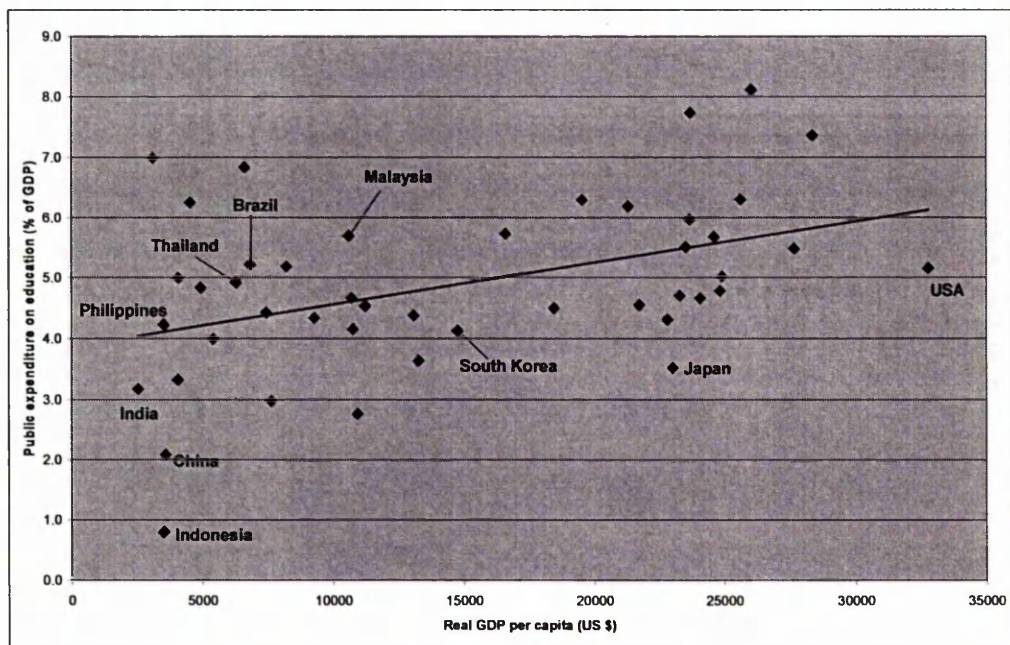
Thailand (UNESCO 2003, Table 14). And very importantly, Malaysia spent 8.3 percent of the total government expenditure for higher education, and ranks the top among them (see Figure 1.2). Statistically speaking, it is an outlier in Figure 1.2! This is a surprisingly high proportion since the level for many other countries was in the range between 2 percent and 4 percent. Above all, all these facts clearly demonstrate that Malaysia has spent a large amount of public funds for higher education.

Besides the international comparisons, the emphasis on (higher) education can also be understood domestically. In order to do so, it is, first of all, worthwhile to briefly understand the role of the federal government in Malaysia. Institutionally and politically speaking, the supremacy of the federal government relative to state governments is very obvious. In financial terms, the Constitution stipulates as follows:

“Such key tax sources as income tax and export, import and exercise duties are almost all collected by the central government as the main taxing authority (Article 96).... The federal government’s position is further strengthened by its capacity for independence of action, since it is able to raise revenues or loans and increase its expenditure at any time, as fiscal and monetary policies are within its jurisdiction; the central government is thus in a position to build up surpluses if it chooses, which is not the case with the state governments (Yusoff 2006, p. 77).”

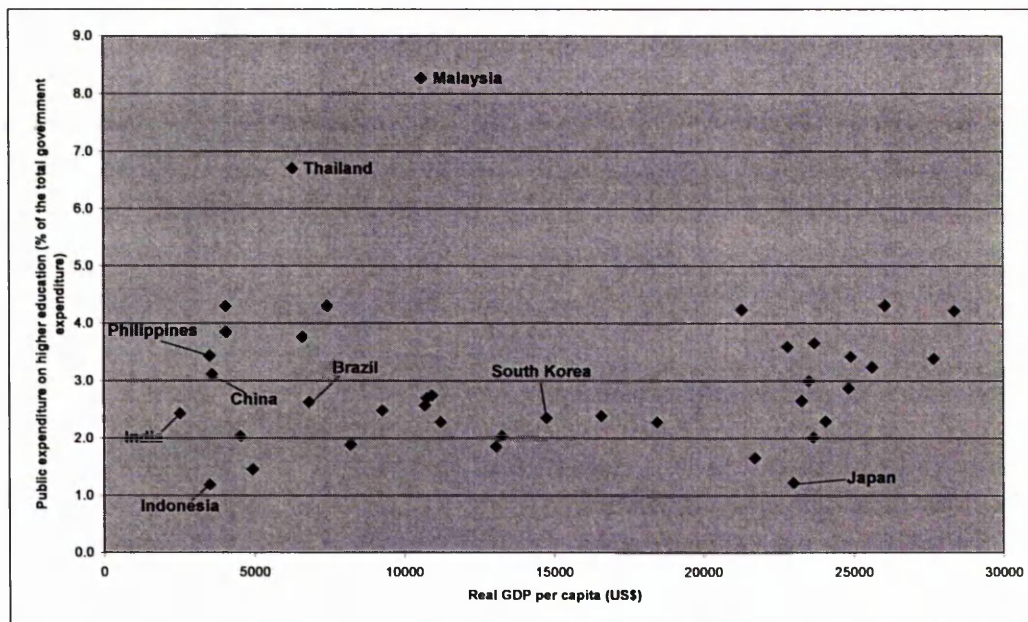
Furthermore, Article 111 (2) of the Constitution restricts the borrowing activity of state governments, so that they secure most of the financial loans from the federal government (Yusoff 2006). These constitutional stipulations have consolidated the position of the federal government *vis-a-vis* state governments (see also Hui 1996).

Figure 1.1 Real GDP per capita and public expenditure on education (as % of GDP) in OECD and WEI countries, 1999



Source: Penn World Table 6.2 and UNESCO (2003) Table 14.

Figure 1.2 Real GDP per capita and public expenditure on higher education (as % of the total government expenditure), 1999



Note: Data on public expenditure are not available for Canada, New Zealand, Russia, Turkey, US and Zimbabwe, such that these countries are excluded in this figure.

Source: See Figure 1.1.

Having discussed all this, let us look at Table 1.2 which shows federal government finance with reference to education. It shows that the education sector accounted for 24.7 percent of total current expenditure and 34.6 percent of total development expenditure in 2002.⁶ In particular, the share of education in total development expenditure has constantly increased over the three decades. It slightly increased from 6.1 percent in 1970 to 7.5 percent in 1980, but jumped to 15.3 percent in 1990 and then to 25.4 percent in 2000. Thus, by the end of the last century, one-fourth of the development expenditure was directed towards the education sector.

Contrary to other levels of education, higher education has received a larger share of education expenditure over time. The higher education share of the current expenditure on education in Malaysia jumped from 10.3 percent in 1971 to 19.9 percent in 1990 (UNESCO 1999, II.19) and then to 34.9 percent in 2004.⁷ By contrast, the share of primary education declined from 44.9 percent in 1971 to 34.3 percent in 1990 (UNESCO 1999, II.19) and then to 29.6 percent in 2004.⁸ The secondary education share has remained almost constant around 30 percent: 29.7 percent in 1971, 34.4 percent in 1990 (UNESCO 1999, II.19) and 35.1 percent in 2004.⁹

When it also comes to development expenditure on education, the share of higher education has remained high. It was 36.8 percent under the second Malaysia Plan (1971-1975) (Malaysia 1981, Table 21-4), and it increased to 47.5 percent under the fourth Malaysia Plan (1981-1985) (Malaysia 1986, Table 19.6). But, whilst it declined to 35.3 percent under the eighth Malaysia Plan (2001-2005) (Malaysia 2006, Table 11-8), the latest ninth Malaysia Plan (2006-2010) allocates 39.8 percent of the education budget for higher education (*ibid*). In contrast, the added share of both primary and secondary education is on the

⁶ Current expenditure is the expenditure for operating capital in place, whereas development expenditure is that for formulating and/or gestating new capital through projects etc.

⁷ <http://stats.uis.unesco.org/unesco/TableViewer/tableView.aspx?ReportId=172> (last accessed on 20 January 2009).

⁸ See footnote 7.

⁹ See footnote 7.

decline over time, and only a total of 28.8 percent of the education budget in the ninth Malaysia Plan was allocated for both primary and secondary education (Malaysia 2006, Table 11-8).

All in all, it is clear that Malaysia's fiscal expenditure on higher education is outstanding at both international and domestic levels. Further, it is also clear that the role of government in higher education is significant in Malaysia. As seen shortly, it has two consequences. Higher education enrolment has increased over time, but we also see a large number of unemployed graduates that are concentrated in one ethnic group.

Table 1.2 Federal Government Finance with reference to Education (in RM million), 1970-2002

Year	Revenue		Expenditure											Overall Surplus divided by credit		Year
	Total	Annual change (%)	Total Expenditure	Current Expenditure			Development Expenditure					Total	Share of GDP (%)			
				Total	Education		Total	Gross		Less: Loan Recoveries	Net Total					
					Annual Change (%)	Total		Share (%)	Annual Change (%)					Total	Share (%)	
1970	2,400	n.a	2,875	n.a	2,163	477	22.1	725	n.a	44	6.1	13	712	-475	n.a	1970
1971	2,418	0.8	3,468	20.7	2,398	536	22.4	1,085	49.7	86	7.9	15	1,070	-1,050	n.a	1971
1972	2,920	20.8	4,291	23.7	3,068	798	26.0	1,242	14.5	112	9.0	19	1,223	-1,371	n.a	1972
1973	3,399	16.4	4,448	3.7	3,342	805	24.1	1,128	-9.2	142	12.6	22	1,106	-1,049	-5.6	1973
1974	4,791	41.0	6,172	38.8	4,318	29.2	24.3	1,878	66.5	187	10.0	24	1,854	-1,381	-6.0	1974
1975	5,117	6.8	7,018	13.7	4,900	13.5	23.6	2,151	14.5	212	9.9	33	2,118	-1,901	-8.5	1975
1976	6,157	20.3	7,862	12.0	5,528	12.8	22.8	2,378	10.6	227	9.5	44	2,334	-1,705	-6.1	1976
1977	7,760	26.0	10,236	30.2	7,098	28.4	24.7	3,217	35.3	274	8.5	79	3,138	-2,476	-7.7	1977
1978	8,841	13.9	11,090	8.3	7,391	4.1	24.2	3,782	17.6	252	6.7	83	3,699	-2,249	-5.9	1978
1979	10,505	18.8	12,040	8.6	7,890	6.8	24.3	4,281	13.2	339	7.9	131	4,150	-1,535	-3.3	1979
1980	13,926	32.6	17,630	46.4	10,292	30.4	21.6	7,470	74.5	558	7.5	132	7,338	-3,704	-6.9	1980
1981	15,806	13.5	24,821	40.8	13,686	33.0	19.9	11,358	52.0	791	7.0	223	11,135	-9,015	-15.6	1981
1982	16,690	5.6	27,111	9.2	15,922	16.3	18.8	11,485	1.1	1,082	9.4	296	11,189	-10,421	-16.7	1982
1983	18,608	11.5	25,541	-5.8	16,124	1.3	18.1	9,670	-15.8	983	10.2	253	9,417	-6,933	-9.9	1983

1984	20,805	11.8	25,580	0.2	17,506	8.6	3,183	18.2	8,407	-13.0	1,009	12.0	333	8,074	-4,775	-6.0	1984
1985	21,115	1.5	25,522	-0.2	18,766	7.2	3,473	18.5	7,142	-15.0	868	12.2	386	6,756	-4,407	-5.7	1985
1986	19,518	-7.6	27,024	5.9	20,075	7.0	3,743	18.6	7,559	5.8	1,064	14.1	610	6,949	-7,506	-10.5	1986
1987	18,143	-7.0	24,296	-10.1	20,185	0.5	3,839	19.0	4,741	-37.3	810	17.1	630	4,111	-6,153	-7.6	1987
1988	21,967	21.1	25,257	4.0	21,212	5.1	4,115	19.4	5,231	10.3	865	16.5	1,186	4,045	-3,290	-3.6	1988
1989	25,273	15.0	28,683	13.6	22,982	8.3	4,407	19.2	7,696	47.1	1,242	16.1	1,995	5,701	-3,410	-0.03	1989
1990	29,521	16.8	32,958	14.9	25,026	8.9	4,962	19.8	10,689	38.9	1,634	15.3	2,757	7,932	-3,437	-0.03	1990
1991	34,053	15.4	36,693	11.3	28,296	13.1	5,782	20.4	9,565	-10.5	1,285	13.4	1,168	8,397	-2,640	-0.02	1991
1992	39,250	15.3	40,493	10.4	32,075	13.4	6,854	21.4	9,688	1.3	1,205	12.4	1,270	8,418	-1,243	-0.01	1992
1993	41,691	6.2	41,337	2.1	32,217	0.4	7,361	22.8	10,124	4.5	1,117	11.0	1,004	9,120	354	0.002	1993
1994	49,446	18.6	45,038	9.0	35,064	8.8	8,098	23.1	11,277	11.4	2,010	17.8	1,303	9,974	4,408	0.02	1994
1995	50,954	3.0	49,093	9.0	36,573	4.3	8,559	23.4	14,051	24.6	2,044	14.5	1,531	12,520	1,861	0.008	1995
1996	58,280	14.4	56,465	15.0	43,865	19.9	10,398	23.7	14,628	4.1	2,091	14.3	2,028	12,600	1,815	0.007	1996
1997	65,736	12.8	59,110	4.7	44,665	1.8	10,360	23.2	15,750	7.7	2,521	16.0	1,305	14,445	6,626	2.4	1997
1998	56,710	-13.7	61,712	4.4	44,584	-0.2	10,528	23.6	18,103	14.9	2,915	16.1	975	17,128	-5,002	-0.02	1998
1999	58,675	3.5	68,161	10.5	46,699	4.7	11,458	24.5	22,614	24.9	3,865	17.1	1,152	21,462	-9,486	-3.2	1999
2000	61,864	5.4	81,579	19.7	56,547	21.1	12,923	22.9	27,941	23.6	7,099	25.4	2,909	25,032	-19,715	-5.7	2000
2001	79,567	28.6	97,989	20.1	63,757	12.8	14,422	22.6	35,235	26.1	10,363	29.4	1,003	34,232	-18,422	-5.5	2001
2002	83,515	5.0	103,768	5.9	68,699	7.8	16,982	24.7	35,977	2.1	12,436	34.6	908	35,069	-20,253	-1.5	2002

Note: Data before 1970 is not available, and data after 2002 on federal government current expenditure functional purposes is not available.

Source: Computed by author using Bank Negara Malaysia, *Monthly Statistical Bulletin*, various issues, and Ministry of Finance, *Economic Report*, various issues.

1.3 Consequences of Higher Education Investment

As the consequence of the high government expenditure on (higher) education, it is hardly surprising to see surges in student enrolment at all levels of education, especially higher education. Indeed, the completion rates of primary and lower secondary levels were 99 and 93 percent by 2003, meaning that Malaysia achieved universal education at these levels (UNESCO 2005, p. 129). On the one hand, the contributory factors include “the abolition of the Common Entrance Selection Examination for entry into lower secondary classes in 1964, and the provision of nine years of universal education comprising six years of primary and three years of secondary education (Malaysia 1981, p. 346).” On the other hand, the construction of schools across the country from the 1960s onwards (see for example, Malaysia 1964, xvi; Malaysia 1976, p. 398) expanded educational opportunities, and was also considered to play a significant role in increasing the completion rates of primary and lower secondary education.

Hence, the emphasis has shifted to upper secondary and higher education and, in particular, the growth of the latter has been remarkable from the mid-1990s (UNESCO 2005, p. 129). The construction of new public universities and colleges as well as the introduction of higher education reforms in the mid-1990s accelerated the trend (see Chapter 4 for details). For example, the number of public higher education institutions increased from 44 in 1990 (Ministry of Education 1992, Table 3) to 72 by 2004 (Ministry of Higher Education 2006, Appendix VI). Equally significantly, the reforms allow private sector involvement in higher education, and there was a total of 559 private higher education institutions in 2004 (Ministry of Higher Education 2006, Appendix VI). Consequently, the number of enrolments at higher education tripled between 1990 and 2000 (see Table 1.3). The gross enrolment ratio at higher education gradually increased from 4 percent in 1980 to 7 percent in 1990 (UNESCO 1999, II.8) but jumped to 26 percent in 2000 and then to 31 percent in 2004.¹⁰

¹⁰ <http://stats.uis.unesco.org/unesco/TableViewer/tableView.aspx?ReportId=167> (last accessed on 20 January 2009).

Table 1.3 Enrolment in Local Public Institutions by Level of Education

	1970	1980	1990	2000
Primary	1679798	2008587	2619170	3446592
Secondary	532340	1059954	1315680	1964607
Higher	11364	36809	100590	313374
Total	2236491	3136848	4109420	5819117

Source: Malaysia (1981, Table 21-1); Malaysia (1986, Table 19-4); Malaysia (1996, Table 10-1); Malaysia (2006, Table 11-4 and Table 11-6).

Needless to say, the government expenditure for higher education pushed up the proportion of the Malaysian labour force with higher education backgrounds. Although it is not possible to depict a long-term trend due to data availability, recent data show that the figure steadily increased from 13.1 percent in 1997 (Department of Statistics 1998) to 19.2 percent in 2004 (Department of Statistics 2005).

Besides this, there is another consequence of government expenditure: a large number of unemployed graduates that are concentrated amongst Malays. Although the exact number of unemployed graduates is yet to be known, Minister of Higher Education noted that there were as many as 80,000 unemployed graduates (*The Star*, 22 March 2005; *The Sun*, 24 March 2005). The Deputy Minister of Human Resources stated that around 70 percent of fresh graduates from public higher education institutions were unemployed (*The Sun*, 3 July 2006). More importantly, it is indicated that the majority of them are Malays. For example, the largest ruling party in Malaysia, namely United Malays National Organization (UMNO), stated in the 2005 General Assembly that around 90 percent of the unemployed graduates are Malays (*Berita Harian*, 22 July 2005; *New Straits Times*, 22 July 2005; *Utusan Malaysia*, 22 July 2005). This proportion is much higher than their share of the total population (at most 65 percent). Graduate unemployment is not concentrated in one ethnic group, even if higher education access and labour market outcomes were equal for all. However, these statements on graduate unemployment indicate that more Malay graduates are unemployed than their population share. It follows that ethnicity plays a significant role in Malaysia's higher education and labour markets.

Unemployment rates generally differ across ethnic group, and Malays have suffered most from unemployment. Table 1.4 shows the rate of unemployment among those aged between 15 and 64 years old.¹¹ It shows that the Malay unemployment rate declined from 8.0 percent in 1970 to 6.5 percent in 1990, which was still higher than 5.3 percent of Chinese and 5.6 percent of Indians. Although the unemployment rates of Chinese and Indians declined to 1.6 percent and 2.7 percent by 2000, the Malay unemployment rate remained at 4.6 percent. All this indicates that ethnic groups face different labour market outcomes.

Table 1.4 Unemployment Rate by Ethnicity, 1970-2000

	Bumiputeras	Chinese	Indians	Total
1970	8.1	7.0	11.0	8.0
1990	6.5	5.3	5.6	6.0
1995	4.6	1.5	2.6	3.1
2000	4.6	1.6	2.7	3.1

Note: The figures for 1970 are Peninsular Malaysia only.

Source: Malaysia (1976, Table 8.3); Malaysia (1991, Table 1.11); Malaysia (2001, Table 3.7)

1.4 Research Agendas and Composition

The problem of graduate unemployment in Malaysia poses some crucial questions since it is concentrated amongst one ethnic group. Why does this problem happen? Why is it Malays, not Chinese or Indians? Is it because Malays are inferior to others in terms of the level of human capital? If so, what is human capital? How should the government deal with or remedy this problem?

Perhaps, various answers can be offered. In order to answer these sorts of questions, however, it is most important to examine appropriately what is going on in Malaysia's higher education and labour markets. In doing so, focus should be put on the ethnic factor in both higher education and labour markets since graduate unemployment is an ethnic issue. Failure to do so does not help us to

¹¹ The unemployment rate in Malaysia is computed by dividing the number of the unemployed by the total number of the labour force in the 15 to 64 years age group (Department of Statistics Malaysia 1998).

understand the fundamental cause of graduate unemployment, and, consequently, no foundation on which appropriate policy implications are considered is obtained. This is where this study has something new to offer. It aims to identify the fundamental cause of graduate unemployment by investigating the ethnic factor in higher education and labour markets.

Against this background, this study starts by appraising critically the human capital theory developed by Mincer (1958, 1974) that underpins higher education investment depicted above. Mincer's rate-of-return to education approach is built on a neoclassical framework with numerous unrealistic assumptions, including equal access to (higher) education for all and a perfect labour market. Hence, it is hardly surprising to see divergences from the initial setting when it is applied to the Malaysian case. Also, it must be emphasized that, despite the application, it still has a major analytical deficiency in understanding the peculiarities of Malaysia's higher education and labour markets. The historical and institutional elements that frame higher education and labour markets are not taken into account in rates of return calculations. Accordingly, the question of why and how ethnicity carries its significance in higher education and labour markets in Malaysia is unable to be addressed adequately.

This study departs from the original theory of Mincer (1958, 1974), but does not seek to modify or apply it or develop remedies to the analytical problems. Neither does it intend to disprove the theory altogether. Rather, it aims to highlight the analytical deficiency and demonstrate that the approach is not relevant in the study of Malaysia's higher education and labour markets. Indeed, Malaysia's higher education and labour markets are not structured as the human capital theory presumes. This study proceeds by breaking with the theory and instead taking a political economy approach that places the role of government at the analytical centre. This approach helps us to understand that government policy reflects the trade-off between efficiency (economic growth) and equity (inter-ethnic distribution) and that the institutional frameworks of higher education and labour markets are constructed on these grounds. Hence, it makes it possible to analyze why ethnic differentials in higher education and labour markets emerge and persist.

A number of researchers from various disciplines have looked into higher education and/or labour markets for Malaysia. Yet, there are only a few studies that comprehensively analyzed both higher education and labour markets in Malaysia (Aziz, Buan and Singh 1987; Lucas and Verry 1999). They focused on the pre-1990s, and none of them looked into the 1990s which have witnessed a series of higher education reforms. It can be understood that part of the reason is the lack of proper data sets on higher education and labour markets. Furthermore, none of them have yet appropriately analyzed higher education and labour markets with a political economy approach. In this regard, this study is the first attempt to analyze the political economy of higher education and labour markets in Malaysia, and to explore the causes of ethnic differentials in higher education and labour markets.

This study is structured as follows. Chapters 2 and 3 critically review the literature on the human capital theory originating with Jacob Mincer. Chapter 2 investigates Mincer (1958, 1974) in great detail, and highlights the theoretical and analytical deficiencies that constrain the applied studies of (higher) education and labour markets. While revealing the statistical significance of factors like ethnicity in education and labour markets, the human capital theory does not help us to understand how education is provided and how labour markets are structured. As mentioned, it leaves aside the historical and institutional contexts from the analysis, so that the question of why factors like ethnicity gain significance in education and labour markets cannot be addressed appropriately. Chapter 3 illustrates this with the Malaysian literature, and argues that these analytical deficiencies are compounded in the empirical application to the Malaysian case. All the applied studies on Malaysia bring the ethnic factor into the Mincerian framework. In spite of this, however, the historical and institutional contexts in which ethnicity gains significance in higher education enrolment and labour markets have yet to be addressed appropriately. This questions the relevance of the human capital theory in addressing Malaysia's higher education and labour markets.

Rather than applying or modifying the human capital theory, Chapters 4 to 6 break with it and instead adopt the political economy approach mentioned earlier. They focus on the role of ethnicity in higher education and labour markets, and aim to elucidate the factors behind ethnic differentials in higher education access and sector selection in labour markets. Yet, this does not mean that we deny the importance of other factors such as gender. Instead, this study posits that these other factors can complement our empirical findings. Indeed, new quantitative findings on ethnicity in higher education and labour markets are derived by analysing the two-percent random sample of the *Population and Housing Census Malaysia 2000* that includes socio-economic information on 435,000 individuals. By the same token, some findings on factors like gender are also revealed, but this research does not look into them in detail since it is more concerned with the ethnic factor. Put another way, the empirical analysis will find future research topics in related fields.

Chapter 4 explains the institutional framework of higher education by being explicit about how inter-ethnic equity concerns are built into higher education policy. The instruments such as the ethnic quota system at public higher education institutions and government control over provision of higher educational services, which were implemented from the onset of the New Economic Policy (NEP), have consolidated the institutional environment. Naturally, then, quantitative analysis reveals the persistence and changing features of ethnic differentials in higher education access. Compared to Chinese and Indians, Malays were advantaged in entering domestic public higher education institutions during the NEP period (1971-1990). But interestingly, when bringing all types of higher education (i.e., domestic and overseas) together, the Malay advantage relative to Chinese disappears. Equally interestingly, Chinese outstripped Malays in the 1990s but Indians have continued to lag behind Malays from the NEP period onwards.

Along similar lines, Chapter 5 examines the institutional framework of labour markets with reference to the efficiency-equity trade-off. In line with the objective of the NEP, Malaysia needs high economic growth to increase the economic pie to distribute. The public sector is attached the distributional role of

providing employment opportunities for Malays, whereas the private sector is expected to spur up economic growth. Consequently, the underlying trade-off manifests itself as the public-private differentials in employment practices, fringe benefits and trade union activities. Quite naturally, quantitative analysis reveals ethnic differentials in sector selection, namely public-private employment choice. Malays opt for public sector employment but Chinese and Indians are more likely to be in private sector employment. Very importantly, it is found that Malay graduates are most likely to go into the public sector. Naturally, this suggests that the fundamental cause of graduate unemployment concentrated amongst Malays is the institutional frameworks of higher education and labour markets set up by the government.

From the empirical findings in Chapters 4 and 5, it can be seen that the ethnic factor persists from higher education through to labour markets. Higher education and labour market policies have influenced the thought process through which various ethnic groups go, and, consequently, they make different higher education and labour market decisions. Chapter 6 analyzes how they decide on public-private choice in higher education (i.e., public or private/overseas higher education) and labour markets (i.e., public or private sector employment). It is quantitatively found that Malays are more likely to enrol in public higher education institutions and then work in the public sector, but the reverse tendency is found with Chinese and Indians. This suggests that various ethnic groups make schooling decisions with future employment in mind, and supports the argument that the fundamental cause of graduate unemployment lies in the institutional framework the government has established.

Chapter 7 summarises the main findings of this study, and concludes by drawing some implications. Above all, this study brings two important contributions to the literature. First, it demonstrates the analytical deficiencies of human capital theory in the study of education and labour markets. To adequately understand the way in which higher education and labour markets in Malaysia work, it is essential to break with it and adopt a political economy approach that places the role of government policy at the analytical centre. Second, this study empirically confirms ethnic differentials in higher education

enrolment and sector selection in labour markets, and suggests that the fundamental cause of graduate unemployment concentrated among Malays lies in the institutional frameworks of higher education and labour markets set up by the government. These arguments and findings can lend themselves to setting the ground on which adequate higher education and labour market policies are considered in future.

Chapter 2

Human Capital Theory, Education and Labour Markets: Review of the Literature

2.1 Empirical Contradictions and Puzzles

The term, 'human capital', is understood as "the productive capacities of human beings as income producing agents in the economy (Rosen 1998, p. 681)." Since Adam Smith (see Blaug 1972; Rosen 1998; Sweetland 1996), it has probably become a norm to address human beings as a factor of production (see also Oi 1962; Walsh 1935).¹² Nonetheless, the concept of human capital is flexible and contingent upon varying contexts since various interpretations are possible. For example, it can be defined through education, on-the-job training, health (i.e., nutritional status or child mortality), or migration etc.¹³ Put differently, the term may incorporate many new elements into its own terrain, as far as they are related to the productive capacities of individuals.

This chapter, or more precisely this research, does not aim to define the term or criticise the terminology. Hence, it leaves aside the debate over treating human beings as capital. Nor does it intend to clarify the content of human capital. Thus, the question of what is meant by 'human capital' is not addressed. Rather, it is more concerned with how it is understood by an existing economic theory. In economics, human capital theory is generally concerned with the output flow of productive services provided by individuals, which is rewarded in the form of wage payments. It gained momentum after World War II when various data sets were systematically available, especially with the emergence of some Chicago economists (Rosen 1992, 1998). In particular, the unexplained portion of income distribution evidenced by Friedman and Kuznets (1954) led some researchers to

¹² For an overview of the history of human capital approach in economics, see Rosen (1998) and Teixeira (2007, Chapters 1 and 2).

¹³ The special issue of *Journal of Political Economy* in 1962 contained various papers extending human capital ideas to socio-economic issues. Besides Mincer (1962), for example, they were Becker (1962) on human capital investment, Mushkin (1962) on health, Sjaastad (1962) on migration, and Stigler (1962) on information in the labour market.

analyze the effects of human capital, especially education, on individual earnings and productivity (Becker 1964; Mincer 1958; Schultz 1961).¹⁴ Since then, the impact of education on individual wage (micro) and economic growth (macro) has been widely researched, and the rate-of-return (ROR) approach developed by Mincer (1958, 1974) has gained prominence in the empirical literature.

The question of why the Mincer approach has been so influential is an important issue to address, perhaps in the history of economics, but it is not the purpose of this study to examine it.¹⁵ The stylized fact is that it has been widely used in the empirical literature, probably due to its empirical convenience (Lemieux 2006; Psacharopoulos 1994). Indeed, in one of his well-cited review articles, George Psacharopoulos (1994) used a large number of country-case studies and computed aggregate ROR estimates by region, level of per capita income, gender, higher education faculty, and sector and type of employment (see also Psacharopoulos 1985). Despite some general critiques of the ROR approach (to which I return later), his intention is, without caveat or theoretical justification, to find general patterns for prioritizing education policy. His latest review, namely Psacharopoulos and Patrinos (2002, p. 4), maintains this stance and argues that: “returns to schooling are a useful indicator of the productivity of education and incentives for individuals to invest in their own human capital. Public policy needs to heed this evidence in the design of policies and crafting of incentives that both promote investment and ensure that low-income families make those investments.”

Based on the ROR approach, these arguments have brought the issue of education investment to the heart of development policy. In this connection, primary education has been considered as the top investment priority due to its higher aggregate ROR than secondary or higher education (see Colclough 1982; Mingat 1998; Psacharopoulos 1985, 1994; Psacharopoulos and Patrinos 2002). Since the World Bank has also adopted the ROR approach when designing its

¹⁴ Mincer made it clear that Friedman and Kuznets (1954) had a big impact on his writings on human capital (see Goldwin 2002).

¹⁵ There are some studies that looked at how Mincer has developed his research programmes (Chiswick 2006; Rosen 1992; Teixeira 2007), but it is not the main issue to address in my research.

education policies (Psacharopoulos 2006), these arguments can lend support to prioritising investment in primary education in the international donor community.¹⁶ In addition, other international organizations seem to adopt the same approach. In an annual *Education at a Glance* series, OECD (2005, pp. 116-154) has a large section on “The Returns to Education”, and discusses ROR estimates in the policy context.

However, it must be highlighted that these arguments have been subject to criticism (for example, Behrman and Birdsall 1987; Bennell 1996, 1998; Birdsall 1996). In a well-known critique of Psacharopoulos (1994), for example, Bennell (1996) points to empirical deficiencies of those individual ROR estimates in some Sub-Saharan African countries, which form the basis of computing aggregate ROR estimates for the entire region.¹⁷ He indicates that diverse labour market conditions characterized by the large informal and public sectors are not necessarily reflected in individual estimation procedures. These problems in country case studies flow over to the aggregate estimates and therefore undermine their credibility. Bennell (1996, p. 195) concludes that aggregate ROR estimates by Psacharopoulos (1994) “should be discarded altogether in any serious discussion of education investment priorities both for the continent as a whole and for individual countries.” This discussion puts in doubt the credibility of the ROR approach in formulating education policy.

Indeed, there are ambiguities around the predictions that come out of the ROR approach. For analytical purposes, assume that the micro-level evidence presented by Psacharopoulos (1985, 1994) and Psacharopoulos and Partinos (2002) holds universally. Consistent with the predictions of Mincer (1958, 1974), it follows that additional schooling leads to growth through aggregation of individual wage premiums. Yet, is it really the case? Not really. As seen shortly, evidence on the impact of education on macro-level growth is very mixed.

On the one hand, a number of researchers conducted regression analysis, and found the positive effects of education on economic growth (for example, Barro

¹⁶ See Fine and Rose (2001) for a critical assessment of the Bank’s education policies.

¹⁷ See also Psacharopoulos (1996) for his reply to Bennell (1996).

1991; Barro and Sala-i-Martin 1995; Mankiw, Romer and Weil 1992; Sala-i-Martin 1997). The most typical work is Mankiw, Romer and Weil (1992). They incorporated secondary enrolment ratios, as a proxy for human capital, in an augmented growth accounting framework, and found the coefficient which is statistically significant and positive.

On the other hand, it is suggested that the impacts of education on economic growth vary across countries. This parameter heterogeneity problem is frequently overlooked in the regression studies, undermining the accuracy and (statistical) significance of their findings (see Krueger and Lindahl 2001; Sianesi and Van Reenen 2002; Temple 1999, 2000). More significantly, other regression studies draw different conclusions by reporting non-positive impact of education on economic growth (see Benhabib and Spiegel 1994; Islam 1995). The most typical is Pritchett (2001). He adopted the same framework with Mankiw, Romer and Weil (1992) and found that the impact of education on macro-level growth is statistically insignificant and negative rather than statistically significant and positive. It is also reported that the coefficient on the education variable is much lower than the micro-level evidence, such as Psacharopoulos (1994), suggests. This not only puts the findings of Mankiw, Romer and Weil (1992) and others in doubt, but puts the question of the micro-macro paradox to the fore (see also Heckman and Klenow 1997, for the absence of evidence for or against externalities of education).

Quite clearly, either at micro or macro-level, regression analysis based on the ROR approach has been the foundation stone of the empirical literature. These studies appear to have tested different empirical models but shared the same goal: to quantify the impact of education on individual wages or economic growth. As seen, however, the mixed, often contradicting, findings as well as empirical critiques have been presented at micro and/or macro levels. In other words, no decisive evidence has been demonstrated. Thus, the main feature of the empirical literature may be the empirical contradictions and puzzles regarding the consequence of education investment, in sharp contrast to what Mincer (1958, 1974) predicts.

Hardly surprisingly, they intensify when taking into account the arguments of reverse causality between education and growth. Bils and Klenow (2000) calibrated a general equilibrium model in which higher expected growth induces schooling decisions. Using cross-country regressions, they showed that “the channel from schooling to growth is too weak to plausibly explain more than one-third of the observed relation between schooling and growth...the bulk of the empirical relationship documented by Barro and others should not be interpreted as reflecting the impact of schooling on growth (Bils and Klenow 2000, p. 1177).” It is now shown that causality can run in the opposite direction, namely from economic growth to education investment.

I do not intend to join the debate by submitting new evidence or to complete an exhausting, perhaps endless, survey of the (contradicting) results in the literature. These empirical exercises can carry, if not great, significance on their own, because the motives vary across the authors. The impact of education on economic growth can be either positive or negative, depending on the models or empirical techniques chosen. And is the same with the issue of causality. The causality can run from education to economic growth, or vice versa.

However, my intention is to suggest that the empirical contradictions and puzzles indicate the analytical deficiencies of the original theory developed by Mincer (1958, 1974). How does the theory evolve with the empirical findings that are unexpected and can contradict the original foundation? How have its advocates responded to them?

In general, there appear to be two approaches, though they are not mutually exclusive to each other. The first approach is to scrutinize and enrich data sets, including how to measure human capital. Attempts were made to create a data set which is a more accurate proxy of human capital than enrolment ratios. The examples are Barro and Lee (1993, 1996), Kyriacou (1991) and Nehru, Swanson and Dubey (1995), all of which are widely used data sets in the literature. Further, De La Fuente and Rafael (2000) recently attempted to improve them to create a newer data set. Yet, their sample is restricted to OECD countries, given the

shortcomings of UNESCO's enrolment data which forms the basis of all these data sets listed in this paragraph.

This indicates that development of the first approach is dependent upon UNESCO's data. However, it has been pointed out that the UNESCO data on enrolment is not free from flaws. In their survey article, Behrman and Rosenzweig (1994) argue that the UNESCO data are not necessarily suitable for cross-country (and even individual country) studies, due to conceptual and comparability shortcomings. Collected from each national government, they do not reflect actual attendance since information tends to be based on opening day enrolments. This problem of measurement error becomes more serious when taking into account cross-country differences in education systems. The starting and finishing ages at each level of schooling, which affect overall duration periods at schools, vary in different countries. These differences, however, are not reflected in estimated mean years of schooling, which are frequently used as an explanatory variable in regression analysis. Above all, the fundamental shortcomings of the UNESCO data can flow over to the data sets which rely on them, undermining the accuracy and credibility of the studies that use them.

By contrast, more fundamental doubt is cast on ambiguities around model specification and estimation. In the empirical search for the true estimate of the impact of education on wage or economic growth, the factors hitherto neglected are brought into micro and macro empirical analysis. At the micro level, researchers have modified the original Mincer approach to take "the form of regressing the earnings of individuals on such variables as native ability, family background, place of residence, years of schooling, years of work experience, occupational status, and the like- the so-called "earnings function" (Blaug 1976, p. 832)." Perhaps, the inclusion of new factors in the regressions reflects some progress in the empirical literature, but it also reflects upon the incapacity of the original Mincer model to explain wage differentials in certain contexts. Indeed, this begs the question of what exactly the estimated models are:

"It is sometimes difficult in all this research to see precisely what hypothesis is being tested, other than that schooling and work experience

are important and that native ability and family background are not (Blaug 1976, p. 832).”

This further prompts some researchers, such as Blaug (1976), to claim that the advocates of the theory make *ad hoc* adjustments to avoid further critiques of the original model or, perhaps, to rescue it.

A similar problem plagues the macro growth literature. To obtain accurate estimates of parameters of interest, researchers bring in a variety of factors that are overlooked in the original model. For example, Mankiw, Romer and Weil (1992) brought a variable indicating human capital stock into the neoclassical growth model which does not assume it. This tendency is quite evident with Barro-type regression studies that include school enrolment ratios, political variables, regional dummies, and religious variables, etc (see Barro 1991; Barro and Sala-i-Martin 1995; Sala-i-Martin 1997). Although many different models can look, at least statistically, reasonable, it is not entirely clear what models are tested (see Levine and Renelt 1992; Sianesi and Van Reenen 2000; Temple 1999, 2000).

Further, it can be argued that the way in which researchers responded to the empirical contradictions and puzzles points to the analytical deficiencies of the original model. In this connection, Pritchett (2001) deserves some more scrutiny. As seen, he has established empirical findings that are inconsistent with the prediction of Mincer (1958, 1974). This casts the analytical capacity of the Mincer model in doubt. The doubt is further compounded by the way in which Pritchett explained why the marginal return to an additional year of schooling economy-wide becomes negative. He offered three potential reasons. First, in some developing countries, educated workers are concentrated in public sector employment due to employment guarantee schemes and engaged in economically unproductive rent-seeking activities. Second, the growth rate of demand for educated labour differs across countries, because of shifts in skill intensity of the economy and the rise of disequilibrium through government policies or technological progress (see also Schultz 1975). Hence, countries with an expanded supply of educated labour can see the marginal return fall, remain

intact or rise. Finally, schools in some countries do not play a role in producing or accumulating human capital (or skills).

The details of the three points aside, two crucial points immediately emerge. First, factors that represent the three answers are not considered in his original growth-accounting framework, but are outside its theoretical scope. Ironically, this suggests that when explaining empirical results, researchers need to go beyond the scope of the model on which their empirical analysis is based. Second, but more crucially in our context, Pritchett's discussion suggests that an enquiry into the impact of education requires an understanding of the different ways in which education is provided *and* labour markets are structured. Needless to say, this is completely neglected not only by the growth-accounting framework but by the Mincer model. Indeed, the Mincer model has the capacity to estimate ROR but does not explain the contexts in which ROR arises.

In sum, the source of the empirical contradictions and puzzles lies in the failure to specify the determinants of wage or economic growth (outcome). It is one thing that the new variables are, at least statistically, found to be influencing wages or economic growth. Perhaps, this reflects progress in the empirical literature. However, it is another that the persistence of the empirical contradictions and puzzles indicates the complexities around the ways in which many factors affect the outcome. Explanation of the process in which they do so requires a careful understanding of various education and labour market contexts. Despite these crucial implications, little critical attention has been paid to the original model developed by Mincer (1958, 1974), on which the empirical framework of applied studies is based. It is exactly for these reasons that I carefully and critically investigate Mincer (1958, 1974) in the section that follows.

The rest of the chapter is structured as follows. Section 2.2 critically assesses the Mincerian earnings function through carefully investigating the logic and analytics of Mincer (1958, 1974). Particular attention is directed towards how the theory captures education and labour markets. Then, I examine two organizing themes that constitute the framework of analysis for the subsequent sections and

chapter. Section 2.3 critically addresses the applied literature around them. Emphasis is placed on the discrepancy between the underlying theory and reality, and critical light is shed upon the capacity of human capital theory to understand education and labour market structures. Section 2.4 summarises the main points of this chapter, and then concludes.

2.2 Mincerian Earnings Function

The Mincerian earnings function takes the following typical form:

$$\ln w(s, x) = \alpha_0 + r_s s + \beta_0 x + \beta_1 x^2 + \varepsilon \quad (2.1)$$

where w denotes observed earnings with s years of schooling and x years of work experience. ROR to schooling, or r_s , means the averaged marginal rate of return to schooling that individuals obtain throughout the lifetime.

In order to understand the underpinnings of equation (2.1), the original works of Mincer (1958, 1974) must be carefully examined. For this purpose, I will follow Heckman, Lochner and Todd (2003) (HLT hereafter), and first look at the compensating differentials model (Mincer 1958), followed by the accounting identity model (Mincer 1974). The purpose of doing so, however, is not to apply his approach. Neither is it to develop modifications of and remedies to it. Rather, it is to locate the human capital theory critically in the context of studying (higher) education and labour markets.

2.2.1 Mincer (1958): Compensating Differentials Model

Regarding the background of his PhD dissertation at Columbia that was later published as Mincer (1958), Mincer noted that:

“At Columbia my interest was in wage determination. Why do people have different wages? Why were there wage differentials? I was approaching it like a Bureau person by looking at various comparisons- by

industry, occupation, age, sex, [and] race (Goldin 2002, p. 5, parenthesis added).”

The research had started with empirical analysis, although he later looked at Adam Smith and then Friedman and Kuznets (1954) to apply price theory and theorise the regularities observed in data (see Goldin 2002; Teixeira 2006).¹⁸ Throughout his life, Mincer has placed much emphasis on empirical work, and, for him, the development of human capital theory “was intrinsically linked to its empirical test and a thorough examination of the empirical evidence available (Teixeira 2007, p. 41).” In the words of Rosen (1992, p. 157), “his work has been closely tied to the development and availability of micro data and Census and other survey sources, for which his professional style and methods are well matched.” As discussed in greater detail in section 2.3, these facts indicate that the literature is guided, and also constrained, by empirical material. Put another way, the choice of empirical strategy is not necessarily guided by the underlying theory.

Empirically having recognized the role of education in earnings differentials, Mincer (1958) developed the ‘compensating differentials model’ by applying the compensating principle of Adam Smith. This model is based on rational choice, so that the overall framework is neoclassical. It is presumed that a representative individual maximises benefits accruing from schooling investments over the lifespan by equating the present value of costs streams against that of benefits. An additional year of schooling reduces the amount of earnings life exactly by another year. The costs, however, are later ‘compensated’ to reward people to engage in occupations that require longer schooling (or ‘training’ in Mincer’s words) periods, or higher earnings.

¹⁸ In an interview, Mincer noted: “The way I approached my topic was inspired by Friedman and Kuznets, after I went back to Adam Smith. Smith did not really have an explicit model, but Friedman and Kuznets had just come out with their book on professional income in which they calculated the capitalized value of an expected income flow conceived as earnings from capital, using implicit rates of return. At that time I asked myself, ‘why can’t I apply this to the entire labor force?’. And that’s basically what I did (Teixeira 2006, p. 9).”

To make these predictions empirically testable, several stringent, unrealistic assumptions are made with regard to the socio-economic environment around the individual. Firstly, methodological individualism requires that individuals be identical in ability and preference and also have equal access to both education and occupations. The latter part comes from the assumptions of perfect capital and labour markets. Perfect labour market would also demand that there be full employment and labour market structures reflect parameters of interest only. Secondly, the only cost assumed is forgone earnings incurred during schooling, and no direct costs such as tuition fees are assumed. Therefore, provision of educational services, which can also cover ownership and management of schools, is represented only by time spent at schools. Thirdly, the individual is assumed to invest only in schooling without post-schooling investments. It means that, as the determinant of earnings differentials, a choice of occupations depends solely on years of schooling. Fourthly, when making an investment decision, the individual is assumed to have perfect certainty of the future. He or she has the knowledge about those levels of earnings streams with different years of schooling that are assumed to be constant over time. Put another way, the decision is made only once throughout lifetime.

Mincer theorised as follows. Let the individual choose years of schooling, s , and get the annual earnings, w_s , under the exogenously given lifespan, T . Let r be exogenously given interest rate at which future earnings are discounted over time, and the present value of lifetime earnings streams with s years of schooling, in the continuous discounting process, can be given by

$$V(s) = w_s \int_s^T e^{-rt} dt = \frac{w_s}{r} (e^{-rs} - e^{-rT}). \quad (2.2)$$

Here let d the difference in the years of schooling, and the present value of earnings streams with $(s-d)$ years of schooling, again in the continuous process, is

$$V(s-d) = w_{s-d} \int_{s-d}^T e^{-rt} dt = \frac{w_{s-d}}{r} (e^{-r(s-d)} - e^{-rT}). \quad (2.3)$$

Assume that T does not depend on s and in both cases above the individual has the same length of earnings life. Then, from the assumptions of individual rationality and maximisation, we let $s = d$ and (2.2) equate (2.3), take natural logarithms and then get

$$\ln w(s) = \ln w(0) + \ln\left(\frac{1 - e^{-rT}}{1 - e^{-r(T-s)}}\right) + rs. \quad (2.4)$$

When T becomes large, the second term on the right-hand side will converge to zero. Therefore, the equation (2.4) can be approximated as

$$\ln w(s) = \ln w(0) + rs. \quad (2.5)$$

This is the typical Mincerian earnings function under the ‘compensating differentials model’. The coefficient on years of schooling is an estimate of internal rate of return to schooling, and roughly equals the interest rate when T is large.

Through this model, Mincer (1958) primarily found that: (i) people with more schooling receive higher annual earnings, (ii) the difference of annual earnings streams associated with different years of schooling becomes larger the higher the rate of return, and (iii) the ratio of annual earnings with levels of schooling differing by a fixed year of schooling is almost constant (see also HLT 2003, pp. 5-6).¹⁹ These predictions of the model were empirically scrutinised, in particular by analysing cross-section data. This is in line with Mincer’s attitude that “the conformity of the empirical features with the model’s predictions” determines the explanatory power of the model (Teixeira 2007, p. 42). As mentioned shortly,

¹⁹ The original aim of Mincer (1958) was to explain earnings differences among the labour force by observing the distribution of training (equivalent to schooling). In his words, the model seeks “to make the distribution of annual earnings a sole function of the distribution of training among members of the labour force (ibid, p. 286).” In this regard, the ratio “serves as a “conversion factor”, which translates it [the distribution of training (or schooling)] into a distribution of earnings (ibid, parenthesis added by author).” This procedure clearly implies Mincer’s emphasis on empirical work.

however, this first model was subject to criticism and was modified in Mincer (1974) to enhance its explanatory power.

2.2.2 Mincer (1974): Accounting Identity Model

In a sense, Mincer (1958) was successful in bringing the role of education to the heart of the literature on human capital and income distribution. In the words of Rosen (1992, p. 159),

“High earnings are required to compensate for the costs of entry, as an equalizing difference. Mincer generalized that idea to connect the modern theory of human capital to survey data on earnings, and to apply it to the broader study of earnings inequality. The key step was to abandon thinking about hundreds of specific professions and occupations. Instead, human capital investment was simply measured by school years attained in survey data, which is nicely ordered and comparable across the whole labor force: it is a much more general classification.”

Nevertheless, Mincer continued to search for more explanatory factors to enhance the explanatory power of the first model. This was so because empirical studies on the basis of Mincer (1958) did not necessarily yield expected results:

“Previous work [namely, Mincer (1958)], mostly due to the availability of data, had placed emphasis on the analysis of schooling investments. However, the empirical results had shown that, despite being positive, the links between educational attainment (measured by years of schooling) and individual earnings were weaker than many had anticipated. Moreover, the empirical analysis had provided limited evidence that fell short of the expectations of the explanatory power of human capital models to define the main features of income distributions. This led to some dismay regarding human capital research (Teixeira 2007, p. 49, parenthesis added).”

The new empirical evidence prompted him to look into other factors that can explain earnings differentials in order to enhance the explanatory power of the

first model (see Mincer 1974, pp. 44-5). In this process, Mincer considered the role of post-school investments, like on-the-job training, in wage determination and attempted to incorporate it to extend the first model and to formulate the 'accounting identity model' (see also Mincer 1962).

The second model, called the 'accounting identity model,' is based on Becker (1964), Becker and Chiswick (1966) and Ben-Porath (1967), and "focuses on the life-cycle dynamics of earnings and on the relationship between observed earnings, potential earnings, and human capital investment, both in terms of formal schooling and on-the-job training (HLT 2003, p. 6)." However, the lack of data on costs of on-the-job training (borne either by firms or employees) constrained Mincer's approach (see also Mincer 1962):

"The consideration of postschool investments in training [such as on-the-job training] was nevertheless cumbersome. On the one hand, the information about the quantity of training each worker received was not likely to be available in the near future. On the other hand, even if these data were available they would tend to underestimate the quantity of training the workers actually received, since the data would be based only on formal programs. Faced with the limitations of the data available, Mincer had to make some simplifying assumptions (Teixeira 2007, pp. 50-51)."

This clearly shows that there are difficulties in translating post-school investments into an empirically measurable and testable variable in an econometric framework. Apparently then, Mincer compromised between available data and theory to find the best available proxy for post-school investments, namely age. The use of age to represent work experience, however, was contentious so he sought an empirical rationale, namely choosing the best functional form to fit the data at disposal (see also Rosen 1992; Teixeira 2007).

Having discussed the background of Mincer (1974), we now consider its analytics by following HLT. Since most individuals make further human capital

investments beyond schooling and $w(s)$ is, therefore, not directly observable, we consider “the variation of earnings with age during the working life (Mincer 1974, p. 11).” However, all the assumptions of the first model, except the third assumption on the absence of post-school investment, are maintained for analytical purposes.

Consider that after completing schooling, the representative individual joins the labour force at time j and makes further human capital investments to enhance earnings (see also Becker and Chiswick 1966). Then we let C_j as the costs at time j , and be a fraction of potential earnings, $C_j = k_j E_j$, where k_j denotes the ratio of the fraction at time j .²⁰ Now let r_j be the rate of return to human capital investments in time j , and then we get

$$E_{j+1} = E_j + r_j C_j = E_j (1 + r_j k_j).$$

By recursion,

$$E_j = E_0 \prod_{t=0}^{j-1} (1 + r_t k_t).$$

These two equations also suggest the absence of simultaneity problem in an econometric sense.

Assume that the rate of return to schooling is constant for all years of schooling and identical across all individuals ($r_t = r_s$), and also that schooling takes place at the beginning of life. Also assume that the rate of return to post-school investments is similarly constant over time and identical across them ($r_t = r_p$). Then, for small r_t , we get

²⁰ Similar to the first model, the cost incurred is only forgone earnings, and no direct costs are assumed here. While schooling, $k_j = 1$ and therefore, $C_j = E_j$.

$$\ln E_j \approx \ln E_0 + r_s s + r_p \sum_{t=0}^{j-1} k_t. \quad (2.6)$$

Accordingly, the schooling model can take the following form:

$$\ln E_j = \ln E_0 + rh \quad \text{where } h = \left(s + \sum_{t=0}^{j-1} k_t \right).$$

Mincer (1974) followed Ben-Porath (1967) with reference to Becker (1964). He assumed that the representative individual makes an optimal investment decision by allocating more investments for the younger periods, and also assumed “a linearly declining rate of post-school investment:

$$k_{s+x} = \kappa \left(1 - \frac{x}{T} \right)$$

where $x = t - s \geq 0$ is the amount of work experience as of age t (HLT 2003, p. 7).” Under the lifespan, we obtain

$$\ln E_{s+x} \approx (\ln E_0 - \kappa r_p) + r_s s + \left(r_p \kappa + \frac{r_p \kappa}{2T} \right) x - \frac{r_p \kappa}{2T} x^2. \quad (2.7)$$

Since potential earnings are deducted by the fraction to get observed earnings, $w(s, x)$, we reach, from equation (2.7), at

$$\ln w(s, x) \approx \ln E_{s+x} - \kappa \left(1 - \frac{x}{T} \right) = (\ln E_0 - \kappa r_p - \kappa) + r_s s + \left(r_p \kappa + \frac{r_p \kappa}{2T} + \frac{\kappa}{T} \right) x - \frac{r_p \kappa}{2T} x^2$$

Let $\alpha_0 = (\ln E_0 - \kappa r_p - \kappa)$, $\beta_0 = \left(r_p \kappa + \frac{r_p \kappa}{2T} + \frac{\kappa}{T} \right)$, $\beta_1 = \frac{r_p \kappa}{2T}$, and then we finally

get

$$\ln w(s, x) = \alpha_0 + r_s s + \beta_0 x + \beta_1 x^2$$

which is similar to equation (2.1). The last two items on the right-hand side suggest concavity of earnings profiles.

As we have seen in the above process, the rates of return to schooling and post-school investment, namely r_s and r_p , are constant over time and identical across all individuals (parameter homogeneity). In addition, the same with other variables such as E_0 and κ , all of them are independent of years of schooling.

Mincer (1974) obtained a couple of implications from this second model; "(i) log-earnings experience profiles are parallel across schooling levels, (ii) log-earnings age profiles diverge with age across schooling levels, and (iii) the variance of earnings over the life-cycle has a U-shaped pattern (HLT 2003, pp. 8-9)." Similar to the first model, the validity of this second model was checked by empirically testing these implications. The development in availability of various data sets, which include more rich information, makes it possible to do so. However, it also reveals that equation (2.1) does not necessarily fit some recent data. For example, HLT (2003) tested the empirical implications for white and black men in America by using the 1940-1990 Censuses, and found that they do not necessarily hold, especially over the recent decades. Naturally then, empirical feedbacks have prompted researchers to search other explanatory factors to increase the (statistical) explanatory power of equation (2.1), as was done by Mincer himself. I address this in detail in the coming section.

2.2.3 Unveiling Higher Education and Labour Markets in Mincer (1958, 1974)

As seen, Mincer (1974) expanded the compensating differential model developed in Mincer (1958) by incorporating experience as another explanatory variable. One of the assumptions in Mincer (1958), namely the absence of post-school investment, was relaxed, whereas all the other assumptions are still in place. Nevertheless, the framework of both models remains the same: costs streams are set against benefit streams accruing throughout the working life.

The Mincerian earning function, namely equation (2.1), builds on standard neoclassical theory. It assumes a world where one representative individual lives in one market. The production capacity of the individual that is accumulated at schools is rewarded in the form of wage earnings throughout the working life. For theoretical and analytical purposes, two totally different markets (market for educational services and market for educated labour) are integrated as if one unique market. Input (or cost) for and output (or benefit) from the market are externally given, and the optimal years of schooling are determined through the market mechanism. Individuals make decisions under perfect foresight situation, which is reflected in both $E(r_{si}) = r_s$ and $\varepsilon \sim (0, \sigma^2)$ in equation (2.1). They have the complete knowledge of lifetime earnings streams associated with each year of schooling, and use it as the sole standard for making decisions. Of course, there are other assumptions on individuals, including identical ability which then leads to another assumption that they are indifferent between years of schooling. Hence, the differentials in years of schooling can be used to account for earnings differentials across individuals.

The primary feature of Mincer's methodology is that he started from an observation of regularities in available data, inferred theoretical predictions from it and then constructed a theory to make the predictions empirically testable. Fundamentally, this approach is similar to Friedman's positivist approach (see also Teixeira 2007).²¹ Following Friedman (1953), the purpose of making all the assumptions is to lay the foundation on which construction of an empirically testable theory is made possible. Whether or not the assumptions are unrealistic, therefore, is of secondary importance. Further, the usefulness or validity of the theory must be judged by an empirical test of the theoretical predictions rather than the realism of the underlying assumptions. It can be put another way:

²¹ In an interview, Mincer noted: "That [to judge theory by its predictive power] was an idea that I had even before that [having met Milton Friedman and George Stigler], but they [Milton Friedman and George Stigler] showed examples." (Teixeira 2006, p. 16, parentheses added)

“If economics could conclusively test the implications of its theorems, no more would be heard about the lack of realism of its assumptions. But conclusive once-and-for-all testing or strict refutability of theorems is out of the question in economics because all its predictions are probabilistic ones (Blaug 1985, p. 703).”

For Mincer, therefore, an empirical test of the theoretical predictions alone is necessary to refute the validity of his own theory. Nevertheless, the question of how many contradicting findings can prove sufficient remains open to question (see Blaug 1985, pp. 702-5).

Apart from its theoretical validity, it seems contentious whether Mincer’s theory is relevant. This is where various value judgements among researchers come in. Many researchers, perhaps though in differing contexts, claim its relevance. It can be argued that Mincer (1958) successfully brought the role of education in wage growth to the heart of economics (Rosen 1992). Further, the fact that equation (2.1) has been applied widely is another contribution. For Rosen (1992, p. 162), equation (2.1) has “become an almost universal reference” and it has “been fit on every earnings data source available for various time periods throughout the world. It is seldom the case in economics that we see replication of the same ideas and, more importantly, the accumulation of empirical results bearing on a specific problem on this scale.” It is even argued by Pedro Teixeira that “it is hard nowadays to find a labor economist who at a certain point of his or her career did not use it [equation (2.1)] (Teixeira 2007, p. 53, parenthesis added).”

I do not intend to put to doubt the validity of Mincer (1958, 1974) per se. Neither do I criticise the value judgements of other researchers mentioned above. Rather, my intention is to question the relevance of his theory in the context of (higher) education and labour markets. As discussed shortly, it entails two major flaws when addressing their peculiarities.

The first problem is that the development of human capital theory is guided, and constrained, by empirical material. Recall that Mincer’s work “has been

closely tied to the development and availability of micro data and Census and other survey sources, for which his professional style and methods are well matched (Rosen 1992, p. 157).” This suggests that information contained in available data sets can determine or influence the direction to which theoretical and empirical developments go. Those who are wedded to Mincer’s approach may argue as follows:

“We believe that such and such a variable is a crucial determinant of the workings of the labour market but we are excluding it from our calculations because we do not have data on it. However, we will use it to explain the results we do get in more informal discourse (Fine 1998, p. 68).”

The model specification is to a large extent influenced by data availability.²² This means that if the original model does not fit the newly available data then it must be modified. Then, a set of new explanatory variables that originally fall into the error term in equation (2.1) would be brought into the econometric framework in order to enhance its explanatory power.

Through modifying or extending equation (2.1), we can see if the new variables are, at least statistically, significant in explaining wage differentials. Perhaps, there is some statistical merit in doing so. However, it causes an inner logical inconsistency since the new variables are brought into a model that does not assume them. As seen in the next section, this problem of theoretical incomparability becomes more apparent as researchers bring variables that represent, for example, ability, quality of schooling, family backgrounds, and labour markets into equation (2.1). Also, as elaborated later, researchers throw into equation (2.1) variables indicating ethnicity and gender, which indeed demand careful consideration of what exactly they represent. Obviously, these procedures amplify the inner logical inconsistency, so that, as Blaug (1972) argued, what the models test becomes unclear. This indicates that the deviations

²² Or, some researchers even manufacture the data at disposal to fit the predictions of Mincer (1958, 1974). Rosen (1992) calls it ‘Mincering data sets.’ If this is the case, these researchers do so to rescue the theory.

from the initial presumption underlying equation (2.1) become evident as it is applied to reality. This suggests that empirical work is not guided by the underlying theory.

Besides the first problem, there is another problem that is related to the issue of theoretical incomparability but is more analytical. According to Friedman-type positivist approach, understanding the context in or mechanism through which empirical regularities emerge is of negligible importance. Therefore, those who are wedded to the approach would not be concerned with how (higher) education and labour markets are structured. Unfortunately, the historical and institutional contexts are of negligible importance for them. Further, education (years of schooling) and labour markets (age and age-squared) are assumed to be separated in equation (2.1), so that the relationship between them is outside the analysis. Hence the social processes that influence one variable or another in differing ways, including the role of government, are neglected.

In this connection, equation (2.1) deserves some more critical scrutiny. The variables in the equation are assumed to be statistically independent. This assumption was made for the purpose of choosing the best functional form that is applicable to the whole cross section data (see Mincer 1974, Chapter 5). Naturally then, the interaction between higher education and labour markets is not presumed. They are treated independently, and their structures are separately understood with reference to parameter estimates alone. This is the consequence of reductionism that reflects methodological individualism underlying the human capital theory.

Above all, Mincer's work is at the theoretical and analytical level built on two black boxes, given the distinction between costs (education) and benefits (labour markets). The first black box lies in the cost side (education). In Mincer (1958, 1974), the difference in types of schooling that individuals receive is represented only by that in 'quantitative' years of schooling. Therefore, how long they stay at school is the only issue of interest, whereas who gets what sort of schooling is far from important. This can be understood by the assumptions: (i) equal access to education and (ii) no educational costs other than forgone earnings.

According to (i) in tandem with the assumption of perfect capital market, all individuals can enrol in schools if they desire so. It follows that neither the processes of allocating individuals to different years of schooling nor policy intervention in education access are taken into account. Therefore, it can be noted that differentials in educational access along ethnic and/or gender lines are set aside. Following (ii), on the other hand, individuals consider forgone earnings alone, when making decisions of schooling investment. Other direct costs, like tuitions fees and types of education (i.e., public or private) among them, are not incorporated in the model. In a broad sense, provision of educational services is represented solely by a linear term in years of schooling.

Needless to say, these assumptions are all unrealistic. Yet, it is not necessarily appropriate to criticise them in isolation from the theory. This is so because, according to Mincer's methodology, the purpose of these assumptions is to make it possible to transform empirical regularities into testable (theoretical) predictions. However, these assumptions indicate an analytical deficiency of the human capital theory. That is, how education is organized and structured is placed outside the analytical scope. In other words, the human capital theory neglects the diverse ways in which education is provided (Fine 1998). Although a variety of socio-economic factors, like the role of government, influence educational provision, Mincer (1958, 1974) keeps them outside the analytical scope (see also Agnobza and Fine 1996). As a result, the theory does not offer an analytical tool to understand the historical and institutional contexts in which human capital is accumulated.

A similar assessment can be made of the second black box that resides on the benefit side (labour market). The assumptions of perfect labour market and equal access to occupations indicate that all individuals join the labour force upon the completion of schooling and get employed throughout the rest of life. Hence, there is full employment with no unemployment. Furthermore, the shifts in productivity and real wages adjust differences in level of human capital and let the economy converge to market equilibrium (see Fine 1998, pp. 61-3). Therefore, "there are extremely complex variations in wages, occupations,

human capital and conditions of work across the population, even in the context of perfectly working labour (and other) markets (Fine 1998, p. 62).”

The realism of the assumptions aside, however, these arguments point to an analytical deficiency in the human capital theory. The diverse ways in which labour markets are structured, let alone their peculiarities, are set aside since labour markets are understood with sole reference to coefficient estimates on the explanatory variables. Or, more fundamentally, they are of negligible importance to Mincer (1958, 1974). Essentially speaking, therefore, equation (2.1) is different from such functions as $Y = f(X)$, where X include an array of variables representing labour supply and demand which affect labour market outcomes. Above all, the human capital theory does not have a theory of labour markets so that it offers little to address the historical and institutional contexts in which accumulated human capital is rewarded.

In sum, the human capital theory developed by Mincer (1958, 1974) starts with two black boxes. On the one hand, how education is organized and structured, and why, are kept outside the scope of analysis. It does not have a theory of education provision. On the other hand, the issue of how labour markets are structured is excluded from the analysis. It does not have a theory of labour markets. All in all, understanding the historical and institutional contexts around (higher) education and labour markets is of negligible importance.

What are the implications of these discussions for understanding (higher) education and labour market peculiarities? What can we learn from them? As indicated repeatedly, I do not intend to question or deny the validity of the human capital theory developed by Mincer (1958, 1974). Rather, my intention is to locate Mincer (1958, 1974) in the study of (higher) education and labour market peculiarities. Hence, the present research, especially the next section and chapter, looks at two themes: (i) how applied studies diverge from the original theory and (ii) how they address the two black boxes. This will help critically examine the relevance of the human capital theory in understanding (higher) education and labour market peculiarities.

As seen in the coming section, the literature has focused on refining the estimate of ROR. For this purpose, equation (2.1) is empirically (and thus superficially) expanded by bringing in new variables that can to some extent indicate higher education and/or labour markets. The examples include ability, quality of schooling, family backgrounds and labour markets. Despite the inner logical inconsistency that emerges, however, no critical reference was made back to the theory underpinning equation (2.1). This is perhaps in line with the feature of Mincer's methodology, but clearly points to divergences from the initial theory. By the same token, the way in which education and labour markets enter the consideration is piecemeal. Hence, the understanding of education and labour markets remains done with sole reference to parameter estimates in variants of equation (2.1).

2.3 The Measurement of ROR

With the formalization by Mincer (1958, 1974), there is the widespread recognition in the literature that education contributes to increased wage or economic growth. Yet, it does not necessarily mean that the literature is free from contradictory findings (recall the discussion in section 2.1). In order to obtain more accurate estimates of ROR, therefore, much attention is directed towards the empirical problems inherent in equation (2.1). For this purpose, researchers have adjusted the Mincerian equation to fit their data sets at disposal.

Indeed, equation (2.1) entails a number of empirical problems. The most typical is the specification problem that Griliches (1977) explicitly posed: what variables should be included in the Mincerian equation? Although I do not undervalue the errors caused by other factors such as estimation methods, it is less important in the context of Mincer (1958, 1974), since estimation techniques are to a large extent influenced by how researchers specify the model.²³ It is for

²³ The issue of sample selection bias caused by a variety of reasons such as occupational choice (including wage vs non-wage employment) and migration (see Schultz 1988) can be treated as part of specification error (see Heckman 1979). Indeed, the econometric

this reason that this section critically investigates the issue of specification in relation to equation (2.1). Besides the question of individual heterogeneity of estimated RORs (see Wills and Rosen 1979), the empirical bias caused by specification errors has prompted researchers to consider more explicitly how human capital is accumulated (education) and how it is rewarded (labour markets). In this regard, applied studies disaggregate the error term in equation (2.1) and bring in the variables hitherto neglected.

The rest of this section critically reviews the literature around the two themes mentioned in the previous section: (i) how applied studies diverge from the original theory and (ii) how they address the two black boxes. For this purpose, focus is on such factors as ability, family backgrounds, quality of schooling and labour markets, all of which are not mutually exclusive to each other. Indeed, each variable seems, at least statistically, valuable in enhancing the explanatory power of equation (2.1). However, the deviations from the original theory become apparent as it is applied to reality, and also that those factors are brought in by piece, in accordance with equation (2.1). Further, the way in which they enter into consideration constrains what we can, or cannot, explain about education and labour markets. Above all, the understanding of (higher) education and labour markets is still done with sole reference to parameter estimates, undermining the analytical relevance of the human capital theory.

2.3.1 Ability

As discussed in sections 2.1 and 2.2, equation (2.1) is built on the assumption of identical ability among individuals. Nevertheless, it is empirically argued that omitting ‘ability’ from the estimated equation leads to bias in OLS estimates since it affects years of schooling and annual earnings (see Card 1999; Griliches 1977; Wills 1986). This prompts researchers to bring ‘ability’ in equation (2.1)

literature on estimation starts from the flaws of Ordinary Least Squares (OLS). Equation (2.1) presumes that ROR is estimated by OLS, but it has been argued that there is a bias in OLS estimates due to the violation of the statistical independence assumption, etc (see Card 1999). In order to overcome this, researchers developed various methods such as instrumental variables (Angrist and Krueger 1991, 2001; Card 1995; Duflo 2001; Hausman 2001), matching methods (Heckman, Ichimura and Todd 1998), and quantile regression (Koenker and Hallock 2001).

that indeed does not presume it, marking a divergence between the original theory and applied studies.

In general, there are three *empirical* approaches of incorporating 'ability' into the earnings function. The first approach is to use a proxy variable for ability, such as intelligence quotient (IQ) scores or other test scores (for example, Blackburn and Neumark 1993, 1995; Griliches and Mason 1972). It is reported that the inclusion of such variables reduces the magnitude of ROR, suggesting that there is upward 'ability' bias in OLS estimates. Nevertheless, this argument must be interpreted with some reservation since the measure of 'ability' is always contentious (see Griliches and Mason 1972).

The second approach is to use natural experiments to compare individuals of the same ability (Angrist and Krueger 1991, 1992; Rosenzweig and Wolpin 2000 for a survey). The underlying idea is that exogenous institutional changes in America influenced schooling decisions and helped create comparable sample groups with same average ability but different levels of schooling: the examples are the introduction of compulsory schooling laws (see Angrist and Krueger 1991 for details) and the Vietnam War draft lottery implemented by the government (see Angrist and Krueger 1992 for details). The details aside, this second approach also makes a point of the role of ability in earnings determination but works more explicitly on data than does the first approach.

The third approach is also explicit about data: to use the sample of identical twins by assuming that monozygotic twins have genetically similar ability and same family background (Ashenfelter and Krueger 1994; Ashenfelter and Rouse 1998; Rouse 1999). Yet, the findings are mixed. Ashenfelter and Krueger (1994) found downward ability bias, while upward bias was reported by Ashenfelter and Rouse (1998). Besides these contradicting results, it remains unclear why there are different levels of schooling among those with identical abilities and family backgrounds.

Whatever approach is taken and empirical evidence found, the advantage of these studies is, at least econometrically, to demonstrate that ability is an

influential factor in explaining wage differentials. However, its sign and the magnitude of ability bias remain uncertain and differ among cases (or samples). Why is it so? For Griliches (1977, p. 18):

“There is no good a priori reason to expect the “ability bias” (or the direct coefficient of a measure of ability in the earnings function) to be positive. Thus, it shouldn’t be too surprising if it turns out to be small or negative.... An asymmetrical attempt to protect oneself against possible biases by putting more variables into the equation or by looking only within finer and finer data cuts, can make matters worse, by exacerbating other biases already present in the data.”

Along similar lines, Fallon and Verry (1988) argued that the empirical merit of the twin studies that can control for innate ability and family background might be offset by smaller variances of schooling differences than randomly chosen individuals. Furthermore, Card (2001) reviewed the recent literature and pointed out a multiplicity of empirical problems that is compounded by omitted variables and measurement error. He concluded that “no individual study is likely to be decisive in the debate over the magnitude of ability biases in OLS estimates of the return to schooling (Card 2001, p. 1157).”

The fact that the applied literature has encountered empirical challenges reflects, or reflects upon, the discrepancy between the original theory and reality. In our research context, there are two problems that are fundamental regarding the theoretical and analytical content. First, the empirical studies ironically lay bare the analytical deficiencies of Mincer (1958, 1974). We see clear divergences from the original theory as it is applied to reality. Though ability was originally excluded in equation (2.1), it enters into the consideration around the equation in order to enhance its explanatory power. This poses the question of what models are tested.

Second, but very importantly, these approaches still regard the structures of (higher) education and labour markets as exogenous. Following the analytics of the human capital theory, there are wage differentials even in the perfect market

setting because individuals make schooling decisions on the basis of their innate abilities. In other words, individuals choose different years of schooling that correspond to their own abilities and allocate them to the corresponding types of occupations. Accordingly, both how education is provided and how labour markets are structured remain unaddressed.

2.3.2 Family Backgrounds

Equation (2.1) does not presume the roles of family backgrounds, such as parental education background, occupation or income. This is due to the assumptions of a perfect labour market as well as equal access to education and occupations. Yet, it has been argued that family backgrounds influence schooling decisions in reality, so that the exclusion of these factors leads to incorrect estimates of ROR (see Behrman and Wolfe 1984; Heckman and Hotz 1986; Schultz 1988, pp. 587-589).²⁴ Either asymmetric information (Stiglitz and Weiss 1981) or financial repression (McKinnon 1973) or both may cause capital and credit constraints that individuals face in making investment decisions. The argument that building schools does not necessarily push up enrolment ratios (Filmer 2007) may also have complemented this empirical trend. Consequently, much attention is directed towards the role of family backgrounds in educational investment, and the variables indicating them enter equation (2.1) which indeed does not presume them.

Nonetheless, this empirical procedure suffers from the multiplicity of empirical problems. The estimation bias caused by omitted variables can be mitigated through including the variables indicating family backgrounds. However, it does not mean that the errors resulted from measurement, namely how to measure family backgrounds, are absent. Although equation (2.1) becomes open to new variables, the empirical literature deals with further technical challenges. The main reason for this is that the empirical strategy is contingent upon available data or evidence and its specification is not dictated by

²⁴ Taubman (1989) is not based on Mincer model but confirms the effect of parental income on educational attainment (see also Behrman and Knowles 1999). At cross-national level, Filmer and Pritchett (1999) report the differences in education gaps by wealth.

the underlying theory. All in all, this indicates that as equation (2.1) is applied to reality it only diverges from rather than converges to the world that equation (2.1) presumes. In this connection, Altonji and Dunn (1996) and Lam and Schoeni (1993) deserve scrutiny.

To reduce omitted variable bias and obtain more accurate ROR in the context of America, Altonji and Dunn (1996) augmented equation (2.1) to include the variables indicating family backgrounds. Unlike the presumption of equation (2.1), the underlying idea is that “parental education and income and other variables have large effects on cognitive development in pre-school years, quality of schooling received, and achievement in school (Altonji and Dunn 1996, p. 692).” The variables included were father’s education, mother’s education and number of siblings. By using the samples of both men and women, they demonstrated that the family backgrounds positively affected years of schooling and wages.

Using the sample of Brazilian men, Lam and Schoeni (1993) also looked at impacts of family backgrounds on ROR estimates. They extended equation (2.1) to include not only parental education of individuals but family characteristics of their spouses and parents-in-law. They dealt with measurement errors that are partly caused by the inclusion of new variables, by sequentially adding the variables to obtain respective R-squared(s) to infer their magnitude. It is then concluded that the inclusion of family background variables reduced the ROR estimates, suggesting upward bias.

The common thesis underlying the two studies is that family backgrounds play an important role in wage determination. Yet, their empirical strategies differ in terms of measuring family backgrounds and sample chosen. Altonji and Dunn (1996) used parental education and number of siblings in the sample of men and women, while Lam and Schoeni (1993) educational backgrounds of parents, spouses and parents-in-law in the sample of men alone. This may reflect the difference in their motives, but, in relation to equation (2.1), suggests three analytical deficiencies of Mincer (1958, 1974). The first point is the inner logical inconsistency on the theoretical level. In both American and Brazilian cases,

equation (2.1) had to be expanded in the way which contradicts its own presumption. The variables that are excluded in the original theory, namely family backgrounds, are brought into the model to enhance its explanatory power in each case. Second, the manner in which empirical modifications are made differs between the two contexts. This suggests that there is no universal recipe of developing empirical remedies to equation (2.1), coinciding with the argument empirical strategy is not guided by the underlying theory. Finally, the factors that can influence the structure of education and labour markets enter the consideration, but around equation (2.1). Consequently, the understanding of education and labour market structures remains insufficient since it is done with sole reference to parameter estimates.

2.3.3 Quality of Schooling

So far, it has become clear that application of equation (2.1) ironically lays bare the discrepancy between the world of Mincer (1958, 1974) and reality and it does not necessarily lead to a deep understanding of education and labour market peculiarities. Indeed, it will be clearer as we look at other factors, such as quality of schooling and labour markets.

Mincer's original theory neglects the provision of educational services, which is insufficiently represented by the linear term of years of schooling alone (recall the discussion on the first black box in section 2.2.3). Obviously, the issue of quality of schooling is outside the analysis. However, there is now the widespread agreement that the quality of schooling influences wage differentials, for example, by affecting productivity (see for example Welch 1966; Schutlz 1988).²⁵ Naturally then, 'quality of schooling' in the form of proxy variables enters equation (2.1), though it does not presume 'quality of schooling'.

²⁵ There is a huge literature on economics of education, which analyses production of human capital at schools. The underlying approach is to employ educational production function like $q = f(Z)$, where q represents educational outcome such as IQ test and Z a vector of explanatory variables such as pupil-teacher ratios and average number of books (see Hanushek 1986). In his survey article, Hanushek (1995) pointed out inefficiencies in the organisation of schools and called for introducing incentive systems in improving the efficiency (which, in this context, is measured by q). However, this approach is theoretically different from ROR analysis, which looks at the labour market outcome.

As seen in ability and family background, there are empirical challenges that alternately appear, including the measurement of 'quality of schooling.' This indicates that researchers need to make different assumptions to let their variants of equation (2.1) fit their cases (or samples). To understand this, let me take a few examples.

To fit their predictions in the Brazilian case, Behrman and Birdsall (1983) made the following assumptions to represent 'quality of schooling' by geography variables: (i) geographical differences in quality of schooling, (ii) immobility of individuals across geographical areas for the purpose of schooling choices, and (iii) no association between quality of schooling in an area and tax burden in the area. Accordingly, they expanded the equation (2.1) to incorporate the geography variables, and found that the estimate on years of schooling is biased upward unless incorporating them.

A similar problem is found in Card and Krueger (1992b) that examined the American case by modifying equation (2.1) (see also Card and Krueger 1992a). It is presumed that variables, like pupil-teacher ratio, average length of school term and relative wages of teachers, indicate 'quality of schooling'. By the same token, they divided the entire sample by state (49 states) and ten-year birth cohort (3 cohorts), both of which they presume reflect differences in quality of schooling. Having estimated RORs for the 147 separate sub-samples, they showed that 'quality of schooling' had significant impacts on ROR estimates.

Clearly, they used different measures of schooling quality, perhaps to fit the data at disposal. It can be surmised that data rather than the underlying theory determines empirical strategy. Nonetheless, it is the statistical advantage of these studies to show effects of schooling quality on wage growth. In spite of the empirical progress, however, these studies still suffer from theoretical and analytical problems. First, there are clear divergences from the original theory as it is applied to reality. The factors that are originally excluded by Mincer's theory are now brought into the expanded Mincerian equation. Further, the divergences surface in different ways. For example, the Brazilian (Behrman and Birdsall

1983) and the American (Card and Krueger 1992b) cases are obviously different to each other so that the authors used different empirical strategies to make their equations fit their data. Although the starting-point of both studies remains the same, namely equation (2.1), the empirical modifications that represent the divergences are clearly different between them.

Second, but more crucially, the understanding of provision of education remains inadequate since it is still done with reference to parameter estimates on the new variables. Though it is statistically clear in certain contexts that there are geographical differences in the measures of schooling quality, it remains unclear why it is so. Consequently, various factors that influence provision of education, including the role of government, are still outside the analysis. The main reason for this is that modifications were solely made in accordance with equation (2.1), which indeed offers little to understand how education is provided and how labour markets are organized.

By the same token, the theoretical and analytical problems depicted above are discerned in the studies that jointly treat ability, family backgrounds and schooling quality. The empirical problems aside, the reason for this is that these studies are still developed around rather than apart from equation (2.1). Besides the divergences from the original theory, parameter estimates remain the tool kit with which to understand provision of education!

To appreciate this point, Glewwe (1996) deserves some scrutiny. He adopted a similar approach to Behrman and Birdsall (1983) and modified equation (2.1) to include ability, family backgrounds and schooling quality. He considered the following Mincerian earnings function:

$$\ln w = \alpha_0 + \alpha_1 H + \alpha_2 x + \alpha_3 x^2 + \alpha_4 A + \varepsilon$$

where H denotes human capital and A ability. Then, he considered:

$$H = g(S, Q, A, B, u)$$

where years of schooling (S), school quality (Q), ability, family characteristics (B), and an error term (u) capturing all other unobservable factors. Then $g(\cdot)$ was substituted into the modified earnings function. Before estimating it, Glewwe split the Ghanaian sample into public sector employment, private sector wage employment and the rest. He estimated RORs for the separate sub-samples, and argued that OLS estimates of ROR would be biased by omitted variables and measurement error.

Quite clearly, the empirical strategy and conclusion of Glewwe (1996) suggests the discrepancy between the original theory and reality. Not only ability but also family backgrounds and schooling quality were, or needed to be, added to equation (2.1) to fit the Ghanaian sample. The factors that were originally excluded from analysis are now brought in.

The understanding of education and labour market peculiarities is still insufficient. Although education and labour markets enter into the consideration, the way in which they do is still piecemeal and shallow. In the case of Glewwe (1996), the Ghanaian education and labour markets are still captured through the coefficient estimates on relevant variables. Unfortunately but hardly surprisingly, both how education is provided in Ghana and why and how the public and private sectors differ can not be understood from the above equation. The main reason for this is that the analysis is based on the theory ignoring the historical and institutional contexts in which education and labour markets are structured. Whatever modifications are made, therefore, the fundamental analytical deficiencies remain as far as they were done so around equation (2.1).

2.3.4 Labour Markets

As discussed in section 2.2.3, equation (2.1) is built on the assumptions of a perfect labour market and equal access to occupations, neglecting the roles of labour supply and demand in wage determination. The way in which labour market are structured is outside its analytical concern. As seen below, however, researchers become more explicit about labour demand and supply, as they apply

the equation to reality. This suggests the discrepancy between the underlying theory and applied studies, ironically highlighting the incapacity of Mincer (1958, 1974) to analyze labour market structures.

A large number of researchers, especially in the context of America, have looked into ethnic differences in ROR and earnings (see Altonji and Blank 1999, for a survey). For example, Welch (1973) examined American black-white differences in ROR between 1959 and 1966, through augmenting equation (2.1) and splitting the data into black and white sub-samples. The new variables, like the dummies indicating sector of employment (that is, federal employee) and features of industry (federal government's share of the industry in which the individuals are employed), were thrown into equation (2.1). The main findings were the existence and persistence of black-white differentials in earnings and the rise in the relative earnings of blacks. Accordingly, Altonji and Blank (1999) empirically confirmed the persistence of ethnic (black-white-Hispanic) differences in RORs and earnings for the years 1979 and 1995.

Treating the ethnic differences as given, the main focus of subsequent studies on America has shifted towards its sources (for example, Murphy and Welch 1992, 1993). In the process, researchers have started to consider the roles of labour supply and demand more explicitly. In the survey article, Katz and Autor (1999) indicated that, in pursuit of the source of wage inequality, the causal factors omitted in equation (2.1) need to enter the consideration so that labour supply and demand would be treated more clearly. Interestingly, they, in the same article, also emphasised the roles of labour market institutions in influencing employment and occupational choice as well as wages. As equation (2.1) is applied to reality, more and more attention is directed towards the factors neglected in the equation.

The shifting emphasis of empirical studies is already indicative of the analytical deficiencies of Mincer (1958, 1974). Although their analytical point of departure was equation (2.1), the empirical focus has become wage determination through taking into account labour demand and supply. The factors representing labour demand and/or supply are brought into the model of

equation (2.1), which does not have a theory of labour markets. Put another way, the capacity of equation (2.1) to explain wage determination needs to be strengthened by taking the factors out of the error term. This suggests not only divergences from the world of Mincer (1958, 1974) but the theoretical incomparability between the underlying theory and applied studies. Furthermore, the incorporation of labour market institutions into the model, as suggested by Katz and Autor (1999), amplifies them. It is seen that equation (2.1) offers little to understand how labour markets are structured.

A similar critical assessment can be made with the issue of gender. First of all, the gender differences in ROR are almost universally reported, but the findings on the sign and magnitude are mixed. Some found higher RORs for males (Psacharopoulos 1994; Schultz 2002), but others observed the opposite (Deolalikar 1993). Further, besides the estimation results, there are differences in type of explanations for the gender gap. To illustrate these points, Kingdon (1998) deserves attention.

In the Indian context, Kingdon (1998) extended equation (2.1) by including dummies indicating caste and religion as well as the variable on father education, and estimated the expanded equation separately for men and women. She found that the ROR estimates for women are lower than those for men, and argued that “the male-female earnings gap is explained only to a small extent by women’s inferior years of education than men, but to a much larger extent by the differential way in which the labour market appears to reward education for the two genders (Kingdon 1998, p. 58).”

One clear theoretical contradiction with equation (2.1) can be seen immediately. Equation (2.1) does not assume gender differences, and nor does it presume the roles of caste and religion in wage determination. Kingdon (1998), however, brought them into the expanded Mincerian equation, although she started from equation (2.1). Perhaps, these variables are crucial to fit equation (2.1) to the Indian case, but, fundamentally speaking, this empirical procedure reveals an inner logical inconsistency. By the same token, this point suggests that equation (2.1) offers little to understand the peculiarities of Indian labour markets.

Through the lens of ethnicity and gender, we have critically assessed equation (2.1) in the context of labour markets, and consistently argued that it is deficient in analyzing how they are structured. Crucially, the analytical deficiency is further compounded by the issue of what ethnic and gender variables account for. As Altonji and Blank (1999) suggested, they may reflect either pre-labour market factors (such as differences in human capital) or labour market discrimination or, maybe, both. As will be made clear in the Malaysian context in the next chapter, it is extremely difficult to discern what exactly these variables represent.

If they represent the pre-labour market conditions, then it becomes necessary to explain why one ethnic group or gender is inferior to the other(s) in terms of human capital. Is it due to innate ability, family background, or quality of schooling? Or, is it due to the consequence of government policy in terms of access to and provision of education? Ironically, the addition of the ethnic and gender variables perpetuates and accentuates the analytical deficiency of the human capital theory.

A similar logic applies with the issue of labour market discrimination. If the ethnic and gender variables reflect it, then it calls for an enquiry into why it is so. Is it due to employers' prejudice or asymmetric information between employers and job-seekers? To answer these questions brings us away from the world of Mincer (1958, 1974). For, the deviations from the assumption of perfect labour market become evident since those representing imperfect labour markets, like discrimination, are now considered. Once opened up to include them, researchers may bring in more variables that seem relevant in their research contexts. It lays bare the multiplicities of labour market structures, which are not captured by equation (2.1). However, the analytical deficiency of equation (2.1) remains since labour market structures is still interpreted with reference to parameter estimates in the estimated equation.

2.4 Conclusions

Numerous achievements made by Mincer (1958, 1974) have been pointed out in the literature. His studies successfully brought the role of education and training in wage or economic growth to the heart of economics (Rosen 1992; Teixeira 2007). His work entered into textbooks such as Borjas (2002). Obviously, this is the cause and consequence of the fact that equation (2.1) has been widely applied, not only in the area of development (Psacharopoulos 1994) but in the area of judiciary (see Gastwirth 1988 cited in Chiswick 2006).²⁶ Perhaps, the fact that equation (2.1) fits the data fairly nicely has contributed to this (see Lemieux 2006).

By the same token, Mincer's works have created room for empirical developments. For example, the exclusion of self-employment from the analysis led to the development of econometric techniques controlling for sample selection (see Heckman 1979). The efforts to reduce the errors caused by omitted variables and measurement may have created the demand for richer data sets. Through various applications, Mincer (1958, 1974) allows researchers to capture the (statistical) significance of various factors on wage or economic growth.

No one can deny the relevance of these points, since motives and purposes vary among researchers. In my research context, however, it is exactly regarding the last point that the relevance of the human capital theory in studying (higher) education and labour market structures is questioned.

Recall the point that the selection of explanatory variables in applied studies is not guided by Mincer (1958, 1974). As seen in section 2.3, different researchers use different variables from available data, in order to fit variants of equation (2.1) to their cases (or samples). However, in the process of applying equation (2.1) to reality, deviations from the starting-point become apparent. On the one hand, this poses the question of theoretical incomparability, namely what models are tested (see Blaug 1972). On the other, this lays bare the discrepancy between

²⁶ Teixeira (2007, pp. 133-5) looked at how many times Mincer's major works have been cited between 1972 and 1991. For example, Mincer (1958) was on average cited 4.5 times per year but Mincer (1974) was remarkably 45.3 times annually.

the world of Mincer (1958, 1974) and reality, and points to the incapacity of equation (2.1) to understand the contexts in which education is provided and labour markets are structured.

Indeed, the way in which the factors that are not presumed in equation (2.1) enter into consideration undermines the relevance of Mincer (1958, 1974) in the study of (higher) education and labour markets. As repeatedly argued, it causes an inner logical inconsistency at the theoretical level. But more crucially, the ex post imposition of these factors is done in accordance with the design of equation (2.1), so that education and labour markets are still understood by reference to parameter estimates alone. Despite the empirical progress in the literature, therefore, the historical and institutional contexts in or mechanisms through which these variables gain significance are yet to be addressed appropriately.

In the next chapter, I will investigate the relevance of the human capital theory in the Malaysian context. It is done through critically assessing its applied studies around the two organizing themes: (i) how they diverge from the underlying theory and (ii) how they address the two black boxes discussed in section 2.2.3. It is shown that Malaysia is full of deviations from the world of Mincer (1958, 1974). It is then argued that Mincer's analysis does not help us to understand the peculiarities of (higher) education and labour markets in Malaysia.

Chapter 3

Human Capital Theory and Malaysia's Education and Labour Markets: Review of the Literature

3.1 Setting the Point of Departure

The previous chapter demonstrated that the enquiry into the impact of human capital on wage differentials has been done on the ground of equation (2.1) put forward by Mincer (1958, 1974). Accordingly, various empirical attempts were made to estimate its true effect, whilst preserving rather than breaking with the general design of the equation. This was especially so because Mincer (1958, 1974) takes two black boxes as the starting-point: provision of education (cost-side) and structures of labour markets (benefit-side). This has directed the attention of researchers towards modifying equation (2.1) in order to better fit reality and enhance its explanatory power. It was primarily done by bringing in the factors that were initially excluded from the analysis, such as ability, family backgrounds, quality of schooling and labour markets.

Despite these endeavours, however, the understanding of the contexts or processes in which education is provided and labour markets are structured remains shallow. The new factors enter the consideration by conforming to equation (2.1) without questioning the inner logical inconsistency caused by their own entry. As a result, the issues of provision of education and structures of labour markets are still addressed in terms of parameter estimates in an econometric equation. Hence, the fundamental deficiency of the human capital theory remains: the historical and institutional contexts in which education is provided and labour markets are structured are yet to be addressed adequately. Ironically, though inevitably, applied studies expose this deficiency and cast doubt on its relevance in the study of (higher) education and labour market peculiarities.

This chapter shows in the Malaysian literature that the human capital theory offers little other than to suggest the (statistical) significance and persistence of

earnings differentials by ethnicity etc. Constrained by the underlying theory, the applied studies incompletely addressed the historical and institutional contexts in which the differentials surface in the Malaysian case. Accordingly, when explaining the causes of such differentials, researchers need to go beyond the scope of the underlying theory. All this together undermines the relevance of the human capital theory in the study of (higher) education and labour markets.

The rest of this chapter is structured as follows. Section 3.2 critically reviews the applied studies on Malaysia around the two themes: (i) how they diverge from the world of Mincer (1958, 1974) and (ii) how they address the two black boxes. It is less concerned with (ii) than (i), since the subsequent section treats (ii) in greater detail through a critical appraisal of Gallup (1997). It is argued that the appeal to equation (2.1) in the Malaysian context does not help capture the peculiarities of its (higher) education and labour markets. The final section concludes by way of summarising the main points of this chapter and briefly explaining the political-economy approach taken in the chapters that follow.

3.2 Applied Studies on Malaysia: A Critical Review

That the original theory of Mincer (1958, 1974) does not dictate empirical strategy gives rise to the diverse ways in which equation (2.1) has been expanded and modified to illustrate reality (recall Chapter 2). Indeed, it remains true of the Malaysian literature. Though a reasonable number of studies applied equation (2.1) to the Malaysian case (see Table 3.1), no single study exactly followed Mincer's empirical strategy.²⁷ In contrast, different researchers adopted different empirical strategies, even though some of them used the same data sources. Further, when it comes to time coverage, two studies examined the pre-NEP period and two others the post-NEP, and the rest investigated the NEP period. Why does all this happen?

One of the potential reasons is data availability. The details aside, it is worthwhile here to consider the implications of data sets used, since they can determine empirical strategy as well as the time period covered. In general, the

²⁷ This entire section is written with reference to Table 3.1, unless specified otherwise.

applied studies on Malaysia can be divided into three groups in terms of data sources. The first group used data sets compiled by RAND Corporation. Indeed, almost half of the studies used either *First Malaysian Family Life Survey* (MFLS-1) or *Second Malaysian Family Life Survey* (MFLS-2) or both (Anderson, King and Wang 2003; Blau 1985, 1986; Chung 2004; Gallup 1997; Schafghans 1998, 2000; Smith 1983; Vijverberg 1987). The surveys for MFLS-1 and MFLS-2 were conducted in 1976-7 and 1988-9 respectively (for the details, see Butz and DaVanzo 1978; Peterson 1993).

The second group used data compiled by the agencies of the Malaysian government, such as Department of Statistics (DOS) and/or Economic Planning Unit (EPU) in the Prime Minister's Department. In chronological order, they are: *Malaysian Socio-Economic Sample 1967* (Hoerr 1975), *Post-Enumeration Survey 1970* (Anand 1983; Mazumdar 1981), *Malaysian Expenditure Survey 1973* (Mazumdar 1991), *Migration and Employment Survey 1975* (Mazumdar 1981), *Malaysian Household Survey* for 1984 and 1987 (Mazumdar 1991), *Household Expenditure Survey 1988* (Lucas and Verry 1999), and *Malaysian Household Income Survey* for 1984, 1989 and 1997 (Deremy and Chescher 1993; Milanovic 2005).

Finally, the last group used unique survey data. Chapman and Harding (1985) employed the *Mara Institute of Technology Tracer Survey 1978*, whose sample is restricted to Bumiputeras alone. Idrus and Cameron (2000) used their own survey data compiled in one state in Peninsular Malaysia (namely, Negeri Sembilan) in 1996. This sample covers Malays only. Therefore, these two surveys are quite limited in terms of sample coverage.

It is clear from the above discussion that researchers need to rely either on RAND data or government data unless they carry out their own original survey. It is for this reason that the majority of the applied studies in the Malaysian literature are concentrated on the NEP period. Indeed, the last survey of RAND data, namely MFLS-2, was conducted in 1988-9, so that it is not possible to cover the post-NEP period. The situation is further intensified by the fact that access to government data is very limited. In fact, those with privileged access

can use these data sets. For example, the researchers having used *Malaysian Household Survey*, *Household Expenditure Survey* or *Malaysian Household Income Survey*, except Branko Milanovic, worked in an advisory group to the Malaysian government in the late 1980s, in preparation for the coming Sixth Malaysia Plan (1991-1995) (see Lucas and Verry 1999, Foreword). Milanovic (2005) used the only government data that covers the 1990s, namely *Malaysian Household Income Survey* for 1997, but in a World Bank project on “Inequality Around the World”.²⁸

Here, I am less concerned with what data are available than with deviations of applied studies from the original theory of Mincer (1958, 1974). In this connection, recall that type of data determines empirical strategy since data can contain some constraints in terms of available information and also since it is not guided by the original theory. Naturally, then, empirical strategy can vary with researchers, even though some use the same data. It can follow that deviations from the original theory become apparent as it is applied to the Malaysian reality.

Hardly surprisingly, none of the applied studies exactly followed the strategy of Mincer (1958, 1974). Perhaps, the closest approach was taken by Mazumdar (1991) who used *Malaysian Household Survey 1987* and considered the same explanatory variables with equation (2.1). However, he split the data by ethnicity and then estimated separate regressions for men and women. This procedure is similar to bringing ethnic dummies into equation (2.1) that does not assume ethnic differentials. Though it is possible to see the (statistical) significance of ethnicity in Malaysia’s education and labour markets, deviations from the underlying theory are evident.

This last point can be furthered by the other studies that similarly considered the same explanatory variables with equation (2.1) together with ethnicity. Apart from Chapman and Harding (1985) that used the restricted sample, these studies

²⁸ <http://web.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTPROGRAMS/EXTPOVRES/EXTDECINEQ/0,,contentMDK:20566397~menuPK:1149339~pagePK:64168445~piPK:64168309~theSitePK:1149316,00.html> (last accessed on 17 March 2009).

brought ethnic dummies into the expanded Mincerian earning function (Milanovic 2005; Vijverberg 1987), or estimated separate regressions by ethnicity (Anand 1983; Mazumdar 1991) or did both (Blau 1985; Lucas and Verry 1999). It is here that what models are exactly tested becomes unclear *vis-à-vis* the underlying theory.

It becomes more so since, besides ethnicity, numerous factors initially excluded from the analysis are empirically brought into the consideration. The examples are gender, age cohort, level of education completed, place of residence, type of occupation and employment status, among many others. Besides years of schooling and experience, for example, Milanovic (2005) preserved the design of equation (2.1) and brought in a number of new variables in the form of dummies: ethnicity, religious education, employment status, non-agro income source, residence (state), occupational status and sector of employment. Perhaps it was done so to let the data tell the reality, but, quite crucially, this points to the discrepancy between the world originally imagined by Mincer (1958, 1974) and Malaysian reality. Indeed, some of the variables indicate labour supply or demand, which was absent in the underlying theory (see section 2.2.3).

Perhaps, it is the merit of these studies to find the (statistical) significance of various factors in the Malaysian context. In some sense, they reflect some features of Malaysian reality. For example, all the studies considered the ethnic factor in some way or other, indicating that ethnicity plays a crucial role in Malaysia's education and labour markets (recall Chapter 1). At the theoretical level, however, what models are tested remains unclear. Equation (2.1) is in various ways augmented or modified to fit the Malaysian reality in the form of available data and to enhance its (statistical) explanatory power. Yet, the inclusion of new variables in the model that does not presume them continues to cause an inner logical inconsistency. Above all, divergences from rather than convergences to the underlying theory remain evident.

The consideration of the issue of specification further intensifies this point. As indicated, the selection of explanatory variables is not universal but diverse

among researchers. It may be related to data sources, but it still varies even among those using the same data. To illustrate this, the studies that employed MFLS-2 deserve scrutiny.

Several researchers used MFLS-2 and estimated the modified Mincerian earnings functions (Anderson, King and Wang 2003; Chung 2004; Gallup 1997; Schafghans 1998, 2000). Unsurprisingly, the difference in selection of variables is markedly clear. On the one hand, the common variables that they considered were age (or a proxy for experience, as is assumed by Mincer) and ethnicity only, which do not already coincide with Mincer. On the other hand, there are a number of additional variables that were considered differently. For Gallup (1997), they were time, job tenure and business cycle etc, but for Schafghans (1998, 2000), gender, failure to complete schooling and residence (urban or rural). Chung (2004) considered marital status, experience of training programmes and employment status (self-employed or otherwise), whereas Anderson, King and Wang (2003) years of on-the-job training, presence of a family business and residence (state and town).

Why are there differences in the selection of variables, though the studies started from the same theory and used the same data? The answer is obvious: it is not guided by the original theory (see also Chapter 2). Whatever data sets are used, numerous factors are brought in the econometric analysis in a rather flexible manner. Nonetheless, what all the applied studies suggest commonly is that Malaysia is full with deviations from the human capital theory, undermining its relevance in studying Malaysia's (higher) education and labour markets. I investigate this issue in greater detail in the section to come.

Table 3.1 Applied Studies in the Malaysian Literature

	Period	Data source	Explanatory variables considered			Notes
			<i>s</i>	<i>x</i>	<i>x</i> ² Other variables	
Hoerr (1975)	Pre-NEP	MSES 1967	✓	✓	× Gender and residence (urban or rural)	<ul style="list-style-type: none"> ▪ Peninsular Malaysia only; ▪ Focus on urban-rural differences which reflect ethnic differences
Anand (1983)	Pre-NEP	PES 1970	✓	✓	See the next row	<ul style="list-style-type: none"> ▪ Peninsular Malaysia only; ▪ Urban employees only; ▪ Estimated various separate regressions by ethnicity, occupation, age cohort, state and gender
Mazumdar (1981)	NEP	PES 1970 & MES 1975	×	✓	<p>PES 1970: Ethnicity, age cohort, level of education completed, language of instruction, and residence (such as type of town & region and metropolitan town)</p> <p>MES 1975: Level of education completed, location, plant size and occupations</p>	<ul style="list-style-type: none"> ▪ Peninsular Malaysia only; ▪ PES 1970; Urban male employees only; ▪ MES 1975; Covered male employees only, and estimated separate regressions by sector (public-private) & by ethnicity (Malays & Chinese only)

Smith (1983)	NEP	MFLS-1 1976-7	×	✓	✓	Ethnicity, residence (metropolitan, semi-urban, foreign country or others), family background (father's and mother's education, father's occupation and number of siblings), level of schooling completed, employment status (salaried, self-employed, employer or others), weeks worked per week, etc.	<ul style="list-style-type: none"> ▪ Peninsular Malaysia only; ▪ Malays, Chinese and Indians covered.
Blau (1985)	NEP	MFLS-1 1976-7	✓	✓	✓	Ethnicity (excluded in the separate regressions by ethnicity), real GDP per capita, cultivated land per capita, rubber price, and interaction terms (age times cultivated land per capita, and rubber price)	<ul style="list-style-type: none"> ▪ Peninsular Malaysia only; ▪ Covers Malays, Chinese & Indians ▪ Also, estimated separate regressions for wives and husbands and by ethnicity
Blau (1986)	NEP	MFLS-1 1976-7	×	✓	✓	Ethnicity , level of education completed, occupation status (farmer, agricultural worker or family business), employment status (self-employed or not), job turnover, holding multiple jobs, hours worked per week, and annual weeks worked per year.	<ul style="list-style-type: none"> ▪ Peninsular Malaysia only; ▪ Covers Malays, Chinese & Indians; ▪ Focus on the self-employed only; ▪ Estimated separate regressions by gender and location (urban-rural); ▪ x is divided by 2, and x^2 by 40.
Vijverberg (1987)	NEP	MFLS-1 1976-7	✓	✓	✓	Ethnicity , residence (urban, rural or others), and land-holdings in acres (included only in the regression for the self-employed)	<ul style="list-style-type: none"> ▪ Peninsular Malaysia only; ▪ Covers Malays, Chinese and Indians; ▪ Estimated separate regressions

Chapman and Harding (1985)	NEP	Mara Institute of Technology Tracer Survey, 1978	✓	✓	✓	Gender (excluded in the separate regressions by gender), failure to complete a course, marital status, and occupation (excluded in the separate regressions by occupation)	<ul style="list-style-type: none"> ▪ Covered Bumiputeras only; ▪ Estimated separate regressions by gender, occupation & sector of employment (public sector vs private sector) ▪ x (and x^2) was measured by the summation of months spent before and after the schooling rather than by computing from age
Mazumdar (1991)	NEP	MEXS 1973 & MHS 1984 & 1987	×	×	×	Ethnicity , age cohort, level of education completed, and residence (urban or rural)	<ul style="list-style-type: none"> ▪ <u>MEXS 1973 & MHS 1984 & 87</u>: Estimated separate regressions by gender for the employees and the self- employed ▪ <u>MHS 1987</u>: Estimated separate regressions by ethnicity (Malays and Chinese only) for men and women
Deremy and Chescher (1993)	NEP	MHS 1984	×	×	×	Residence (Kuala Lumpur, metropolitan, large urban, small urban or rural), failure to obtain academic qualifications, marital status, head of household, $s/10$ and $s\text{-sq}/100$ (to replace s), $x/10$ (to replace x) and $x^2/100$ (to replace x^2)	<ul style="list-style-type: none"> ▪ Served as Technical Adviser to the Government; ▪ Peninsular Malaysia only; ▪ Chinese males only;

Gallup (1997)	NEP	MFLS-2 1988-9	✓	✓	✓	Ethnicity , time, job tenure, business cycle, urban worker, earnings in kind, part-time job status, and the number of jobs held	<ul style="list-style-type: none"> ▪ Peninsular Malaysia only; ▪ Males only; ▪ Also estimated separate regressions by ethnicity (see section 3 for details)
Schafghans (1998)	NEP	MFLS-2 1988-9	×	✓	×	Level of education completed, failure to complete schooling, residence (urban or rural), and $x/100$ (to replace x^2)	<ul style="list-style-type: none"> ▪ Peninsular Malaysia only; ▪ Estimated separate regressions by ethnicity (Malays and Chinese only) for men and women
Schafghans (2000)	NEP	MFLS-2 1988-9	×	✓	×	Ethnicity , level of education completed, failure to complete schooling, residence (urban or rural), and $x/100$ (to replace x^2)	<ul style="list-style-type: none"> ▪ Peninsular Malaysia only; ▪ Malays & Chinese only; ▪ Estimated separate regressions by gender
Lucas and Verry (1999)	NEP	HES 1988	✓	✓	✓	Ethnicity (excluded in the separate regressions by ethnicity), gender, training, sector of employment (public or private), status of employment (part-time or full-time) and plant size (union plant, tiny plant or otherwise)	<ul style="list-style-type: none"> ▪ Served as Technical Adviser to the Government; ▪ Peninsular Malaysia only; ▪ Estimated separate regressions by residence (urban and rural), and also by ethnicity for urban & rural areas
Anderson, King and Wang (2003)	NEP	MFLS-1 1976-7 & MFLS-2 1988-9	✓	✓	✓	Ethnicity , Years of on-the-job training, Presence of a family business, Presence of sales of home products, and Residence (state and town).	<ul style="list-style-type: none"> ▪ Peninsular Malaysia only; ▪ The sample covers parents only; ▪ Estimated separate regressions for men and women

Chung (2004)	NEP	MFLS-1 1976-7 & MFLS-2 1988-9	×	✓	✓	Ethnicity , level of education completed, marital status, experience of training programmes, and employment status (self-employed or not)	<ul style="list-style-type: none"> ▪ Peninsular Malaysia only; ▪ Covers Malays, Chinese & Indians/others;
Idrus and Cameron (2000)	Post-NEP	Household survey in Rantau, N. Sembilan, 1996	×	✓	✓	Level of education completed, employment status (self-employed or not), skills, health conditions, and interaction terms (sector times level of education, skill, health conditions, x & x^2)	<ul style="list-style-type: none"> ▪ Sample coverage restricted; ▪ Malays only.
Milanovic (2005)	Post-NEP	MHIS 1984, 1989 & 1997	✓	✓	✓	Ethnicity , gender, religious education, employer, employee, unpaid family worker, non-agro income source, residence (state), occupational status, and sector of employment (public sector or not)	<ul style="list-style-type: none"> ▪ A World Bank project; ▪ Covers both Peninsular Malaysia & Borneo;

Note: MSES (Malaysia Socio-Economic Sample); PES (Post-Enumeration Survey); MES (Migration and Employment Survey); MEXS (Malaysian Expenditure Survey); MFLS-1 (First Malaysian Family Life Survey by RAND); MFLS-2 (Second Malaysian Family Life Survey by RAND); MHS (Malaysian Household Survey); MHIS (Malaysian Household Income Survey); HES (Household Expenditure Survey).

3.3 Relevance of the Human Capital Theory Questioned

The previous section indicated that all the applied studies took into account the ethnic factor in the Mincerian framework (see Table 3.1). This is the reflection that ethnicity plays a pivotal role in (higher) education and labour markets. In this connection, Gallup (1997), who rather comprehensively addressed ethnic differentials in male earnings by using MFLS-2, deserves close scrutiny in this section.

First, I illustrate his empirical strategy (in section 3.3.1) and then the way of interpreting results (in section 3.3.2) in some detail, in order to emphasise the two points: (i) deviations from the underlying theory of Mincer (1958, 1974) are apparent and (ii) the human capital theory offers little to understand (higher) education and labour markets in Malaysia. This lays the foundation on which to assess the relevance of the human capital theory in the study of Malaysia's higher education and labour markets. Further, it helps reveal their general features obscured by the application of the human capital theory and set up an alternative analytical angle for the chapters that follow.

3.3.1 Empirical Strategy of Gallup (1997)

Gallup identified the significance of the ethnic factor in the Malaysian context, by briefly looking at the implications of racial riots in 1969. He then considered the role of ethnicity in wage differentials following two approaches, in both of which he preserved the design of equation (2.1).

The first approach is to expand equation (2.1) and bring in ethnic dummies. He considered the following Mincerian equation:

$$\ln w = \alpha_0 + \alpha_1 s + \alpha_2 x + \alpha_3 x^2 + \underbrace{\alpha_4 t + \alpha_5 Z + u}_{\varepsilon \text{ in equation (2.1)}}$$

where t is time in years, Z a vector of other individual characteristics and u error term (all the other variables are the same with equation (2.1) in Chapter 2). The variables in Z were ethnic dummies, job tenure (measured by the amount of time spent in particular jobs), business cycle (deviations from GDP trend), urban

worker dummy, a dummy for earnings payment in kind, a dummy for part-time job holders, and the number of jobs held.

Crucially, the factors that initially fell in the error term (or, ε) in equation (2.1) are now decomposed into three parts in the above equation, namely t , Z and u . Put another way, the variables listed in the previous paragraph like ethnicity were not presumed by Mincer (1958, 1974) but they are now formally considered in accordance with the design of Mincer's equation (2.1). This clearly suggests that there are some factors which the underlying theory exclude but turn out to be crucial in the Malaysian context. Hence, they needed to be brought into the analysis to fit the Malaysian reality exemplified through the data. Since they are considered only in an empirical discourse, however, this procedure causes an inner logical inconsistency with the underlying theory and points to deviations from it as it is applied to the Malaysian reality.

The similar assessment can be made of the second approach: estimating separate regressions for Malays, Chinese and Indians. For example, a variable on years of schooling, or s in the above equation, was excluded, but instead three education dummy variables indicating level of education completed (primary, secondary and tertiary levels of education, with 'no schooling' as the reference group) were brought in. This is to capture the wage increments to these levels of education for the three ethnic groups. On the other hand, cohort dummies were included whilst keeping s instead of inserting the three dummy variables. It was done so for the purpose of obtaining more accurate estimates of ROR and accounting for ethnic wage gap more accurately.

In contrast to the first approach, ethnicity is now used as the unit with which to split the sample. Nonetheless, the essence remains unchanged: ethnicity plays a key role in determining type of education and/or type of labour markets and wage differentials. Put differently, the three ethnic groups were deemed to have attained education differently and entered different labour markets. Combined with the arguments on the first approach, therefore, it can be argued that deviations from the original theory of Mincer (1958, 1974) become apparent as it is applied to Malaysia.

3.3.2 Addressing Education and Labour Markets?

Given the arguments thus far, some questions arise quite naturally. How did Gallup address Malaysia's education and labour markets? More fundamentally, what do the ethnic factors in his study represent? Where do they come from? Do they reflect the differences in the level of human capital (as in perfect market setting) or education and labour market conditions (as in imperfect market setting) or both?

Having found ethnic differentials in earnings and their lifetime profiles, Gallup argued that at the time of survey "Malays had the highest rate of return to a year of schooling at all education levels (Gallup 1997, p. 9)."²⁹ He attributed the reason for this to government education policy:

"The timing of these ethnic trends in education is exactly what one would expect from an effective affirmative action program coming on line in the 1970s. Changes in government policy in the 1960s and early 1970s, an irritant to non-Malays which contributed to the May 13, 1969 race riots, coincided with a stagnation in Chinese and Indian educational progress, and an acceleration in Malay attainment. In 1965, lower secondary school was made accessible to all students, but since government-supported Chinese-language secondary schools were abolished in 1961, this helped the Malays more than the Chinese. Starting in 1971, English-language schooling was phased out one school level per year until all public school classes were taught in Malay. Malays are given preference among university applicants (*ibid*)."

In general, the reference to government policy played a part in diverting our attention towards the relationship between government policy and ethnic

²⁹ The findings on earnings differentials and profiles were obtained by the first and second approaches respectively. The first approach showed that "Malays and Indians still earned only 76 % and 83%, respectively, of Chinese earnings (Gallup 1997, p. 8)." The second approach demonstrated that "all three groups received their highest earnings at 18-19 years of work experience, but peak Chinese earnings were 5.6 times their initial earnings while peak Malay and Indian earnings were 2.3 and 2.9 times their initial earnings, respectively." (*ibid*)

differentials in education attainment. Yet, this point does not come as a surprise to those who have studied Malaysia. More importantly, there is a clear inconsistency between the way in which the estimates of ROR were obtained and the way in which they were explained. The role of government entered the scope of analysis in an informal discourse, once searching for the reason of Malays' higher ROR. In other words, government policy was introduced in an *ex post* basis into the model that does not presume it, whilst preserving its generic form.

It must be stressed here that Gallup pointed to structural constraints placed by the government, within which individuals are to make schooling decisions. Indeed, policy intervention in favour of Malays, which clearly contradicts Mincer's assumption of equal access to education, indicates that some Chinese and Indians may not invest in higher education due to the constraints. In light of the access made unequal by an exogenous government intervention, we have an imperfect market setting unlike the perfect market setting of Mincer. Ironically, then, Gallup suggests that higher education in Malaysia is not organized as the human capital theory presumes and that ethnicity plays a role in it.

Further, Gallup's analysis obscures one crucial point: do the ethnic differentials in ROR mean that the human capital of Malays is on average superior to those of Chinese and Indians? Do the ethnic dummies in the first approach represent ethnic differences in human capital or different labour market conditions? If they indicate differences in human capital, it must be explained why an ethnic group's human capital is superior or inferior to others' with reference to both access to education and provision of educational services. Obviously, this would require him to go beyond the scope of his own analysis, but he did not say much about this.

Above all, Gallup addressed (higher) education in inappropriate manner. This is so because his empirical analysis (or regression) is based on a model discarding the historical and institutional contexts in which higher education is provided and organized. Consequently, the questions of why and how ethnicity gains significance in the realm of higher education are yet to be addressed appropriately. All these criticisms together pose serious challenges that

undermine the relevance of the human capital theory in studying the peculiarities of Malaysia's higher education.

The similar assessment can be made of labour markets. He found stagnating Malay earnings relative to Chinese and Indians, and then explained about it as follows:

“A possible cause of stagnating Malay earnings [despite their progress in education attainment] is the inability of Malays to break into the more lucrative occupations. If Malays are unable to move from rural agriculture to urban clerical, professional, or managerial work, their earnings profiles would remain low and flat over time.... Malays have a lower representation in the higher paying occupations than the Chinese, but they have moved in large numbers from agriculture into the military and police, clerical and sales jobs, and white collar jobs. So occupational segregation of Malays is not a likely explanation for the failure of Malays to catch up to Chinese earnings in the MFLS2 sample. Chinese occupations have been more stable, with some movement out of agriculture, into blue collar jobs, out of clerical and sales jobs, and into white collar jobs. Indians have become scarcer in agriculture, and more numerous in blue collar jobs (Gallup 1997, p. 10, parenthesis added).”

This reasoning undermines the relevance of the human capital theory in the study of Malaysia's labour markets. Two points must be considered. First, there is an inconsistency between the way in which earnings differentials were estimated and the way in which they were explained. Here, Gallup took into account the association between the ethnic factor and labour market structures when looking for the causal factors behind the issue of interest (stagnated Malay earnings). It had been excluded in both Mincer (1958, 1974) and Gallp's empirical strategy, but was later included to account for the Malaysian reality. He brought up the factor that had not been used in his own regression analysis but later turned out necessary to interpret the empirical results. This reflects upon the incapacity of the human capital theory to explain Malaysia's labour markets.

Second, when accounting for stagnating Malay earnings, Gallup pointed to varying functioning of labour markets that the three ethnic groups experience. This is a clear divergence from the Mincer's assumption of perfect labour market that all labour markets work in an identical manner. It can follow that unlike the presumption of Mincer those with the same years of schooling may neither face the same labour market nor be rewarded similarly. Above all, Gallup suggested that Malaysia's labour markets are not structured as the human capital theory presumes and that ethnicity plays a role in them. Indeed, why are Malays unable to obtain lucrative occupations? Why does it happen? Is it due to their inferior human capital or institutional factors in labour markets? Gallup did not say much about this.

The difficulty of answering these questions lies in the fact that ethnic differentials, or ethnic dummies in the first approach, cannot be clearly discerned either as representing human capital or as indicating other characteristics (recall the discussion in section 2.3.4). As far as labour markets are concerned, ethnic differences in human capital accumulation, for example, must be examined with reference to features of schools and the workplace. Why one ethnic group's human capital is superior or inferior to another's in terms of labour market rewards (i.e., wage) must be explained. However, it paradoxically opens up the need to understand pre-entry conditions and post-entry processes, which are indeed beyond the scope of the underlying theory. Here, the deviation from the perfect labour market assumption becomes evident since it admits the differing functioning of labour markets that each ethnic group enters. On the other hand, if ethnicity carries other characteristics and plays a role in explaining wage differentials, then the existence of imperfect labour markets, including ethnic discrimination, have to be accepted. Again, this points to the varying functioning of labour markets, which diverges from the initial assumption of the perfect labour market.

In sum, Gallup sought to examine the role of ethnicity in earnings differentials, by breaking down the error term of Mincer's equation (2.1). At the statistical level, this allowed him to obtain more accurate estimates of ROR. In spite of the application, however, the way in which he addressed (higher) education and

labour markets remains piecemeal. His ex post reference to government policy and differing labour markets does not help us to examine why and how ethnicity carries significance in (higher) education and labour markets. Needless to say, the reason for this was that little critical attention was paid to the fundamental deficiency of the human capital theory that sets aside the historical and institutional factors framing (higher) education and labour markets. As a corollary, the peculiarities of Malaysia's higher education and labour markets can not be understood appropriately, as long as the analysis is based on the human capital theory.

These criticisms are further compounded by the fact that Gallup did not assess education and labour markets jointly. For example, some reference was made to the role of government in education, and it was implied in the informal discourse that ethnicity played a role in *both* education and labour markets. However, this was not explicitly treated, probably since Gallup's analysis is based on the model presuming statistical independence among explanatory variables. Consequently, the role of government in education was addressed in isolation from labour markets, so that the persistence of the ethnic factor from education through to labour markets is overlooked completely.

The ethnic differentials in ROR or earnings do not come out of a vacuum. They can result from education or labour markets or, quite likely, both. To understand why and how they emerge, therefore, it is necessary to root the analysis of the role of ethnicity in (higher) education and labour markets within historical and institutional contexts. In this connection, the question of what government education and labour market policies aim at needs to be addressed appropriately. As is clear from the discussion so far, human capital theory offers little guidance in doing so. Obviously, the reason is that it incorporates the social, like ethnicity, in inappropriately manner. In order to illustrate the peculiarities of Malaysia's higher education and labour markets, therefore, it is better to break with the human capital theory altogether.

3.4 Conclusions

The fundamental flaws of human capital theory in the study of education and labour market peculiarities, as illustrated in Chapter 2, are compounded in the empirical application to the Malaysian case. The deviations from the initial theory became more apparent as it was applied, and the understanding of education and labour market peculiarities remains constrained by its neglect of historical and institutional elements. Rather than applying the human capital theory or remedying its analytical deficiencies in the Malaysian context, therefore, it is essential to break with it.

On the other hand, this chapter revealed some important features of Malaysia's higher education and labour markets, such as ethnicity and the role of government. Due to government intervention from the 1970s, Malays have an institutional advantage in higher education enrolment. In addition, Malaysia's labour markets work differently to each other, and Malays, Chinese and Indians appear to face differing labour markets. Consequently, it is indicated that the ethnic factor persists from higher education to labour markets and government policy seems to play a part.

These points, like ethnicity and government policy, lend themselves to defining the grounds for an alternative analytical framework. Instead of human capital theory, therefore, the next three chapters place the role of government and ethnicity at the centre of analysis. This political economy approach enables us to incorporate the historical and institutional contexts in which higher education is provided and labour markets are structured. Accordingly, our understanding of why and how ethnicity carries its significance in both higher education and labour markets becomes even deeper.

In Malaysia, it is of paramount importance to maintain social stability due to the ethnically heterogeneous population. The post-Independence period from 1957 until 1969, which can be characterised by little government intervention, resulted in racial riots in 1969 (Crouch 1996; Means 1976, 1991). An emergency was declared for the entire nation and parliament suspended. The inter-ethnic

socio-economic imbalances, which had worsened during the period, were judged to be the root cause of the riots, and consequently, the NEP was introduced in 1971 to achieve and maintain social stability through the win-win principle (Bowie 1991; National Operations Council 1969). The government was empowered to intervene in various quarters of society, and education and labour market policies have been formulated and implemented to achieve the end (Faaland, Parkinson and Saniman 1990). Consequently, these policies have developed around the ethnic factor, and represent the underlying trade-off between efficiency (economic growth) and equity (inter-ethnic distribution).

As will be seen in Chapter 4, higher education policy has placed emphasis on (inter-ethnic) equity aspects, on which its general institutional framework was constructed. In terms of access, the ethnic quota system at public higher education institutions, which is in favour of Malays, was introduced in 1971 and remained in place until 2002. In line with this, the government has intervened in the way in which higher education services are provided. Although the higher education reforms were introduced from the mid-1990s primarily due to efficiency reasons, they were done so on the basis of rather than apart from the institutional framework already in place. Thus, higher education enrolment remains determined by ethnicity.

By contrast, the fundamental concern in labour markets is to more explicitly strike a balance between economic growth and inter-ethnic distribution (see Chapter 5). This is so because Malaysia needs economic growth to increase the pie to distribute and to achieve a win-win situation for all ethnic groups. For this purpose, the public sector is attached the distributional role of providing employment opportunities for Malays, whereas the primary concern in the private sector is to pump up economic growth. This suggests that the efficiency-equity trade-off lays the core foundation for the institutional framework of labour markets, setting the context in which public-private differentials in various aspects emerge. Inevitably, then, ethnicity tends to be associated with specific sectors of employment (i.e., public or private sectors).

Above all, it can be easily surmised that government policy has played a vital role in perpetuating the ethnic factor from higher education through to labour markets (see Chapter 6). Put differently, the structural conditions and constraints set by the government constitute the environment in which various ethnic groups make different decisions on higher education enrolment and sector selection. On the one hand, this indicates that, due to government higher education and labour market policies, these decisions are made simultaneously rather than separately. On the other hand, it can follow that the fundamental cause of the graduate unemployment, which is concentrated amongst Malays, is the institutional framework established by the government for the purpose of maintaining social stability.

Chapter 4

Higher Education: Equal Access for All?

4.1 Introduction

As briefly mentioned in the previous chapter, the inter-ethnic equity concerns embodied in the NEP were the foundation of higher education policy in Malaysia. They have continued to be so even from the mid-1990s, when the higher education reforms driven by efficiency concerns were introduced whilst preserving the equity concerns. This chapter will argue that this results in a dualistic structure within higher education: public higher education with equity concerns and private higher education without it. Despite the introduction of the reforms, therefore, ethnicity has continued to assume significance in terms of access to higher education and provision of educational services. Above all, unlike the presumption of the human capital theory, both access to higher education and the provision of higher educational services are controlled by the government for the purpose of maintaining social stability.

This chapter primarily aims to explore the peculiarities of Malaysia's higher education with a political economy approach that places the role of government at the centre of analysis. Hence, the thrust of this chapter is not to apply and/or develop human capital theory and to remedy its analytical deficiencies. The chapter starts from the position that higher education in Malaysia does not work as the theory suggests. By taking the political economy approach, it becomes possible to understand the historical and institutional context in which ethnic differentials in higher education participation emerge. Then, I attempt to find some indication of the extent to which Malaysia's higher education policies have influenced the decisions of various ethnic groups.

Indeed, this chapter updates empirical findings on ethnic differentials in higher education enrolment in the 1990s. As Chapter 1 showed, government expenditure for higher education has increased from the 1990s. However, evidence on higher education enrolment by ethnicity has not been available from 1988 onwards. Some general information like the absolute number of higher education enrollees

can be found in government publication such as five-year Malaysia Plans. Yet, empirical evidence on higher education enrolment broken down by ethnicity is absent in the literature. Against this background, this chapter offers some new empirical findings on higher education enrolment through analyzing the two percent random sample of the *Population and Housing Census Malaysia 2000*.

The rest of this chapter is structured as follows. The next section looks at the historical and institutional backgrounds of higher education with reference to the role of government. It starts with the NEP period, which generally determines the direction of higher education in the 1990s. Here, particular reference is made to the shifting emphasis on equity, in terms of access to higher education and provision of higher educational services. Section 4.3 develops empirical strategy to investigate ethnic differentials in higher education enrolment. This chapter also explains the data sets and variables to be used. Section 4.4 discusses the empirical results. Section 4.5 summarises the main points of this chapter and concludes.

4.2 Historical and Institutional Backgrounds

Before starting to discuss higher education, it is worthwhile to understand briefly the overall education system in Malaysia.³⁰ Students automatically move up to lower secondary schooling, at the end of which they sit in the Lower Secondary Assessment (Penilaian Mengah Rendah, PMR) that decides the type of upper secondary education (academic or vocational). At the end of upper secondary schooling, they progress to sit the exam of Malaysia Certificate of Education (Sijil Pelajaran Malaysia, SPM). To pass SPM is the requirement for continuing through to higher education. After SPM, some students move on to post-secondary schooling. At its end, they take the exam of Malaysia Higher School Certificate (Sijil Tinggi Pelajaran Malaysia, STPM) or matriculation exams, achievement in which determines their higher educational enrolment. According to Ministry of Education, the age cohort of higher education is 19-24 years old.

³⁰ This paragraph draws on Ministry of Education (2000, Chart 1).

The rest of this section is divided into three parts. First, we examine the NEP period, starting from a brief overview of post-independence period. It is developed around access to higher education and provision of educational services. Next, we cover the 1990s, which is our primary area of research. Lastly, we look at previous findings on higher education enrolment in order to lay the foundation on which empirical studies are carried out from Section 4.3 onwards.

4.2.1 The NEP: Higher Education as Equity-Enhancing Device

At the time of Independence in 1957, Malaysia inherited an education structure which had been influenced by the British higher education system and ethnically segregated under the British colonial policy (Loh 1975; Rudner 1994; Selvaratnam 1985). Since the beginning, the issue of ethnicity in higher education enrolment has been contentious. The Federal Constitution prescribes a clause on the special rights of Bumiputera in higher education: Article 153 argued for the reservation of quotas in terms of the public service, scholarships and other education or training privileges (Federation of Malaya and Singapore 1957).

Indeed, the ethnic representation in higher education enrolment was a key issue. The country's first university, namely the University of Malaya (UM), had been founded in Singapore in 1949, in response to the *Report of a Commission on University Education in Malaya* published on 1 May 1948 (the Carr-Saunders Report).³¹ However, as Table 3.1 shows, the representation of Malay students at the UM remained low, although it had gradually increased over time. The majority of students continued to be Chinese, and the ethnic imbalance in terms of enrolment was quite apparent. Indeed, out of the total graduates between 1959-60 and 1969-70, Malay graduates accounted for 25.9 percent only, and Chinese 59.5 percent (Malaysia 1971a: Table VII). The root cause of this ethnic imbalance was believed to be the exam-based admission selection which seemed

³¹ After Independence, the UM was separated into two divisions: KL division and Singapore division. Although the KL division was once closed in 1958, it was reopened and established as the UM in KL on 15 January 1959. On the other hand, the Singapore division was opened as the UM in Singapore. The latter became the University of Singapore (now the National University of Singapore) in January 1962, and the KL division continued to be the UM. See also Selvaratnam (1985).

to favour Chinese (Takei, Bock and Saunders 1973). As seen shortly, this is where the government started to intervene to ensure that the ethnic distribution of higher education enrolment to a large extent reflects the population distribution.

Table 4.1 Student Enrolment at UM by Ethnicity, 1959/60-1969/70

	Malay	Chinese	Indians	Others	Total
1959-60	19.3	60.6	12.7	7.4	100
1960-61	22.1	56.2	13.5	8.2	100
1961-62	21.5	57.9	11.9	8.7	100
1962-63	20.4	58.6	12.0	9.0	100
1963-64	20.6	60.0	12.2	7.2	100
1964-65	24.4	59.8	9.5	6.3	100
1965-66	25.4	58.9	10.3	5.4	100
1966-67	28.8	56.5	9.1	5.6	100
1967-68	30.7	56.1	8.3	4.9	100
1968-69	32.8	55.7	7.2	4.3	100
1969-70	35.6	52.9	7.7	3.8	100

Note: Others include Ceylonese, Eurasians and other ethnic groups.

Source: Computed by author from Malaysia (1971a), Table I.

The racial riots in 1969 and the consequent introduction of the NEP brought about shifts in higher education policy. Since it was deemed that access to (higher) education had worsened inter-ethnic socio-economic disparity, the NEP marked a departure from the system assuming little governmental role and instead empowered the government to intervene in higher education (Selvaratnam 1985). Accordingly, higher education was attached the role of inter-ethnic redistribution under the goal of restructuring society, and expected to contribute to enhancing social mobility and multiplying income levels of Bumiputera (Faaland, Parkinson, and Saniman 1990).³² In parallel, to develop the country's human resources in light of a growing economy was also set at the core of the education and training programmes (Malaysia 1976: 384-5). Given the NEP principle of win-win (see Malaysia 1971b, p. 1), however, more emphasis was placed on the inter-ethnic redistribution through education (Lee 2004).

³² Faaland was engaged in formulating the NEP between 1969 and 1971 under the NOC headed by Tun Razak.

The NEP attached the core responsibility of resolving the inter-ethnic concerns to the government (Ministry of Education 1980, quoted in Selvaratnam 1985, p. 493). The government reinforced its own position in higher education by passing the Constitution (Amendment) Act in 1971 and the University and Universities Colleges Act (UUCA) of 1971. The decision-power regarding a number of educational matters became centralised around the Minister of Education (Lee 1996).³³ The Minister has now discretion over the general direction and administration of Malaysia's higher education (*ibid*). And the Central University Admissions Unit (or Unit Pusat Universiti, UPU), established at the Ministry of Education, has handled all matters related to university admission based on ethnic quotas (*ibid*). They can include preparation of exam questions, and selection and allocation of candidates to public university.³⁴ Unlike the pre-NEP period, the autonomy of higher educational institutions was eroded by the government initiatives of controlling higher education in line with the NEP.

Above all, higher education in Malaysia became institutionally framed by the emphasis on equity more than efficiency in order to ensure that the ethnic distribution of students at higher education institutions reflects the population distribution. This framework was further complemented, or strengthened, by the introduction of two instruments: ethnic quota system at public higher education institutions and government control over provision of higher educational services. The former was institutionalized to achieve the ethnic balance in higher education enrolment, whilst increasing the number of education opportunities through the establishment of public higher education institutions. In parallel, the government started to control very explicitly over the latter, namely provision of educational services, such as type of education (public or private), medium of

³³ The Section 3, which is on "Responsibility of Minister", stipulates that: "The Minister shall, subject to the provisions of this Act, be responsible for the general direction of higher education and the administration of this Act, which shall be in accordance with the national policies, strategies and guidelines on higher education formulated or determined by an authority established under any written law for such purposes (Malaysia 2002, p. 4)."

³⁴ In 2004, the Ministry of Education was divided into the Ministry of Education and the Ministry of Higher Education. Now the Unit is under the latter ministry. In an anonymous interview (conducted on 8 August 2005), an official close to the admission revealed to me that the Unit still handles all matters regarding local public higher education and that ethnic factor constitutes an important element of the admission process.

instruction, curriculum and student activities. These together reinforce the institutional framework of higher education, which, unsurprisingly, gives rise to ethnic differentials in higher education enrolment.³⁵

Ethnic Quota System: Unequal Access to Higher Education

The government started to explicitly control access to public higher institutions for inter-ethnic equity concerns. In particular, it aims to make sure that the distribution of higher education enrolees reflects the population distribution of various ethnic groups. This suggests that if various ethnic groups enrol higher education equally or if the enrolment is randomly determined then the distribution of students at higher education institutions is the same with the population distribution. Hence, it can be argued that divergence from equal enrolment ratios is the contention of higher education policy in Malaysia. Against this background, I define 'advantage' and 'disadvantage' in higher education enrolment by divergence from equal enrolment ratios.³⁶

Indeed, the main reason for introducing the quota system was that during the post-Independence period Chinese were over-represented at the UM, thereby limiting educational and economic opportunities for Malays. Malaysia (1971a) made proposals to the government to introduce a quota system in university admission (*ibid*, pp. 44-5). Accordingly, the government passed the Constitution (Amendment) Act in 1971 and the Universities Colleges Act of 1971, which also required all higher institutions to give more admissions to Bumiputera (mainly Malay) students. Although there were demands opposing the introduction among

³⁵ Although from a different analytical perspective, Wang (1977, 1978, 1980, 1983) also argued that the environment created by the government influenced the decisions of ethnic groups differently.

³⁶ Some may counter-argue that divergence from equal enrolment ratios is a reflection of different underlying choice structures across ethnic groups, not 'advantage' and/or 'disadvantage'. Though this could be one possibility, this argument does not necessarily help us to investigate the effects of higher education policies such as the quota system on the pattern of higher education enrolment. The main reason is that this argument does not explicitly consider the institutional context (or environment) in which individuals make schooling decisions. There are indeed many elements of demands, but the issue of government intervention is most crucial in my research context, since, as seen later in the main text, it influences the decisions of non-Bumiputeras. For analytical purposes, therefore, I follow the aim of government policy when interpreting divergence from equal enrolment ratios.

the Chinese community (Kua 1999), the component parties of the ruling coalition, Barisan Nasional (BN), reached an agreement on quota in 1979: 55 percent for Bumiputera, 35 percent for Chinese, and 10 percent for Indians and others (Boo 1998, p. 52).

This does not mean that the government did not increase the number of higher education opportunities. On the contrary, they did so. Through increased public expenditure for education (see Table 1.2), new university campuses and new universities were constructed, increasing the number of higher institutions throughout the NEP period. After the country's second public university, the Science University of Malaysia (Universiti Sains Malaysia, USM), was established in 1969, five new public universities were constructed up to 1990.³⁷ In addition, two public colleges were also established.³⁸ Accordingly, the number of student enrolments in higher education increased (see Table 1.3).

The introduction of the ethnic quota system meant that the new opportunities would be distributed in favour of Bumiputeras, mainly Malays. Indeed, the new higher education institutions established were publicly run since, as seen later, private involvement in higher education was banned during the NEP period. In this sense, access to higher education was institutionally made unequal for all. Further, one of the new colleges, namely MARA Institute of Technology (MIT), was constructed exclusively for Bumiputeras (see Ibrahim 1987).³⁹ It was given an aggressive role in pushing up the overall Bumiputera enrolments and contributing to lifting Bumiputera's representation in higher education. For example, around 35 percent of the total Bumiputera students in local public

³⁷ They were: (i) National University of Malaysia (Universiti Kebangsaan Malaysia, UKM) in 1970; (ii) Agricultural University of Malaysia (Universiti Pertanian Malaysia; in 1999 re-named Putra University of Malaysia, Universiti Putra Malaysia, UPM) in 1971; (iii) Technology University of Malaysia (Universiti Teknologi Malaysia, UTM) in 1972; (iv) International Islamic University of Malaysia (Universiti Islam Antrabangsa, UIA) in 1983; and (v) Northern University of Malaysia (Universiti Utara Malaysia, UUM) in 1984 (Malaysia 2005).

³⁸ They were: MARA Institute of Technology in 1971 and Tunku Abdul Rahman College (TARC) in 1969 (Malaysia 2005).

³⁹ The MIT had ten campuses in the ten states in the 1980s (Ibrahim 1987, p. 222). They were: Sabah, Sarawak, Perlis, Trengganu, Johor, Malacca, Pahang, Perak, Kelantan and Kedah. Most of them are Malay-dominated states.

higher education institutions enrolled at the MIT in 1988 (Malaysia 1989, Table 13-3).

Above all, the introduction of the ethnic quota system reflected the government's emphasis on inter-ethnic equity. It has not only contributed to expanding higher education opportunities for Bumiputeras but played a significant role in consolidating the institutional framework of higher education.

Government Control over Provision of Higher Educational Services

The second instrument to facilitate inter-ethnic distribution came from the government control over provision of higher education services; types of education (public or private), medium of instruction, curriculum and student activities. Together with the quota system, this second instrument contributed to ensuring the position of Bumiputeras, especially Malays, in the sphere of higher education.

Firstly, private involvement in higher education was strictly limited and controlled by the government. The forms of private education in the 1970s were tuition classes or pre-university courses, while those in the 1980s extended to credit transfer or twinning programmes through the relationship between domestic private colleges and overseas universities (Tan 2002). There was a typical example to show the government's reluctance to accept active private sector involvement. In 1968, various quarters of the Chinese community proposed to establish a privately funded university, Merdeka University (Kua 1999). However, due to the ethnic nature of the university, the government rejected the proposal in 1979 (*ibid*).⁴⁰ It was not until the mid-1990s that the government fully began to allow private sector involvement. For Molly Lee,

⁴⁰ In the 1970s, the Chinese Guilds and Associations submitted a memorandum to the Cabinet Review Committee on Education headed by the then Minister of Education (later the Prime Minister), Dr Mahathir, to approve the establishment of privately sponsored university (Kua 1999). The proposal to establish it aimed at solving part of this problem (*ibid*). For, due to the ethnic quota system, "out of about 250,000 [non-Malay] students enrolled in pre-University classes each year, only 20,000 managed to secure places in local universities (*ibid*, p. 110, parenthesis added by author)." For further detailed stories of this case, including legal battles in High Court, see Kua (1999, Chapter 9).

“this [governmental approach] reflected a desire to maintain tight control over the education system in order to allow education to play a pivotal role in promoting the standards of the Malay community (Lee 2004, p. 455, parenthesis added).”

Secondly, the medium of instruction at higher education institutions was converted from English to Malay by 1983, completing the full conversion at all levels of schooling (Malaysia 1984, p. 348).⁴¹ For example, the UKM, established in 1970, was intended to use Malay as the medium of instruction from the inception. Only in exceptional cases where they are established under the Company Act, higher education institutions are allowed to adopt other languages such as English as the medium of instruction. Nonetheless, the consent of the Minister of Education is mandatory to even do this.⁴²

The third component lies in curriculum, in which UUCA of 1971 plays a substantial part. By principle, it covers all universities and colleges in Malaysia, except UIA (Lee 1996). When higher institutions intend to start new curriculum or change existing curriculum, for example, they must obtain approval from the Minister of Education (Malaysia 2002). Further, the act states that private institutions were restricted to “diploma courses and degrees conferred by foreign universities through twinning programmes (Lee 1996, p. 319).” The government intervention was quite substantial in determining what was taught at higher education institutions.

Finally, Section 15 of UUCA also put a ban on the involvement of students and faculty members in political and trade union activities, whether or not in

⁴¹ This is related to the emphasis on language policy and development of Malaysian textbooks to achieve the NEP’s over-arching goal of national unity (see Mukherjee and Singh 1985; Thomas 1986). As to the language policy, “the then Minister of Education, Dato Haji Abdul Rahman Ya’akub, announced through national television that from 1 January 1970 the final step would be taken toward the ‘full conversion’ of the English schools to Malay-medium, beginning with Standard 1, and Standards 1 and 2 in 1971, and so on, until 1983 or 1984 when all English-medium instruction up to the university would be converted to Malay-medium (Hon-Chan 1977, pp. 32-3).”

⁴² With reference to the language policy, Wang (1978) argues that converting to Malay as the medium of instruction intensified the disenchantment of Chinese.

Malaysia or outside Malaysia (Malaysia 2002).⁴³ The government intended to disallow their participation in public discourses (Lee 1996).

Together with the ethnic quota system, the government control over provision of higher education services was expected to resolve the ethnic imbalance in higher education enrolment. As Selvaratnam suggests, “[the social and] political expediency necessitated the state’s direct intervention in order to precipitate drastic changes in the structure and organization” of the higher education system (Selvaratnam 1985, p. 494, parenthesis added). In turn, both instruments have supplemented or reinforced the institutional framework of higher education, thereby forming the basis on which ethnic differentials in enrolment patterns emerge.

4.2.2 The 1990s: The Emergence of a Dualistic Structure in Higher Education⁴⁴

Under the National Development Policy (NDP) which replaced the NEP in 1991, education remained highly prioritized (Malaysia 1991, p. 157). However, the 1990s witnessed some important shifts in the history of higher education in Malaysia. The liberalisation and privatisation moves from the mid-1980s gradually affected higher education policy, finally leading to a set of reforms from the mid-1990s (Lee 2004). What drove these shifts? What changes did the higher education reforms bring to the institutional framework of higher education?

The introduction of the higher education reforms is a reflection of the combination of economic and industrial demands (efficiency) and educational demands from non-Bumiputeras (equity). Towards the end of the NEP era, the government had already recognized the negative effects of the NEP. It diverted some affluent non-Bumiputera students away from domestic higher education (Selvaratnam 1988), accelerating the outflow of foreign exchange and

⁴³ The Section 16 of UUCA stipulates that the power “to suspend or dissolve any organization, body or group of students” lies in the Vice-Chancellor, appointed by the Minister of Education (Malaysia 2002, p. 14).

⁴⁴ This part is also based on Aihara (2009).

deteriorating the services account (see Malaysia 1991, p. 181). The accumulated frustration of non-Bumiputeras over the NEP and their increased demand for education, which had caused the economic problem, prompted the government to gradually open up the higher education sector (Lee 2004; Tan 2002). As discussed earlier, for example, it started to allow private twinning programmes with foreign higher education institutions from the 1980s (Malaysia 1991, p. 181). But it was not until the mid-1990s that the government allowed private sector involvement in various aspects of higher education.

Indeed, the reforms were expected to “cut the country’s overseas education bill of 2.5 billion ringgit (\$1 billion) a year (*International Herald Tribune*, 13 February 1996).” This would be in line with the macroeconomic strategy of achieving fiscal balance (Malaysia 1991, p. 40). By the same token, they were also expected to open up the opportunity for private companies to engage in higher education. For example, the then Minister of Education, Najib Razak, said that “the government was willing to consider all applications from private Malaysian companies that were capable of setting up universities (*International Herald Tribune*, 13 February 1996).”⁴⁵ Foreign universities were now enabled to set up branch campuses and expand their business in Malaysia. Above all, positive impacts on expanding places at higher institutions and producing a qualified labour force to match economic and industrial demands were expected (Malaysia 1996, p. 339).

In 1996, the Parliament passed and the government enacted five acts. The Education Act 1995 deals with the overall education system, whereas the amendments to the UUCA of 1971 the corporatisation of public universities (Malaysia 1996, p. 334). The corporatisation was expected to improve the management and autonomy of public universities (*ibid*), but did not necessarily bring the expected results due to the difficulty in securing fiscal sources (Soda

⁴⁵ Najib Razak is the son of late Tun Razak, the country’s second Prime Minister. After leaving the Minister of Education to Hishamddin Hussein, who is a relative member of Najib and the chief of UMNO Youth (as of February 2008), Najib, as of February 2008, has been the Minister of Defense since then and become the Deputy Prime Minister in 2004 under Dr Mahathir’s successor, Abdullah Ahmad Badawi (Koy and Koroh 2005).

2006). The opposition against raising tuition fees for this purpose was believed to be an important cause of funding problems.

In parallel with this, private sector involvement in higher education was formally allowed. From the mid-1990s, the government started to have clear policies on private higher education with the three acts: Private Higher Educational Institutions Act (PHEIA), National Council of Higher Education Act, and National Accreditation Board Act (NABA) (Lee 1999). Doors were opened for the private sector to participate in higher education, creating new education opportunities, but private higher education institutions are required to complement the public sector (*ibid*).

It will be argued below that these reforms brought new additions to the existing institutional framework of higher education but neither altered fundamentally nor diminished the NEP regime. Rather, they were introduced in accordance with it, so that, as seen shortly, the NEP's instruments remain preserved. In this sense, it can be argued that the scope and scale of government intervention broadened with the introduction of the reforms (see also Aihara 2009). Indeed, the UUCA still provides for the role of the government in managing higher education. Crucially then, this suggests that ethnic differentials in enrolment pattern would be more complex since the equity-efficiency trade-off takes the additional form of public-private differentials in higher education.

Is Access to Higher Education Equal Now?

Throughout the 1990s, the government has been in the mode of expanding higher education in order to cater for economic and industrial demands as well as educational demands. For example, it was expected during the Sixth Plan period (1991-95) that “with the completion of new facilities and expansion of existing facilities, the intake into tertiary level education will increase substantially (Malaysia 1991, p. 175).” Such expansion mode was also accompanied by the higher education reforms, especially the rise of private higher education. For example, the number of private universities increased from 0 in 1995 to 16 in 2001 (Kementerian Pendidikan Tinggi 2000, quoted in Lee 2004, p. 444). The number of private colleges also jumped from 156 in 1992 to 690 in 2001 (*ibid*).

Accordingly, the total number of public higher education institutions and the total enrolment increased over the decade (see Chapter 1).

Does this mean that the government outstripped the quota system? Is access to higher education made equal now? Not really. The quota system was still maintained in the public stream, and it remained so until 2002, when the government replaced it with a meritocracy system.⁴⁶ At the same time, further higher education participation of Bumiputeras was promoted by “the expansion in capacity and the introduction of new courses at ITM [or MIT] (Malaysia 1996, p. 331, parenthesis added).” This means that the NEP regime concerned with equity did not disappear after 1991 since the ethnic distribution of enrollees at public higher educational institutions was still the focal point of higher education policy.

Crucially, the way in which the government introduced the reforms led to a dualistic structure in terms of government policy on access. That is, the quota system is applied to the public stream, while the private stream is free from it. This mirrors the importance of reconciling economic and educational demands, whilst preserving the institutional framework set in place.⁴⁷ Put another way, the underlying trade-off between efficiency and equity has also started to manifest itself in public-private differentials.

⁴⁶ In fact, the ultra UMNO Youth criticized the disadvantage of the meritocracy system and submitted a proposal to the Ministry of Higher Education regarding the matter (*New Straits Times*, 23 May 2005). In fact, they and the influential UMNO Johor strongly advocated for the re-introduction of the quota system to keep places for Bumiputeras, mainly Malays (*The Star*, 13 June 2005; *Bernama* 9 July 2005).

⁴⁷ However, there were some political attempts to extend the quota system to the private stream, although it finally failed in the end. The issue was picked up in Parliament due to demands from Malay members of parliament (*International Herald Tribune*, 13 February 1996). According to Soda (2006) that analysed the parliamentary proceedings, this issue was favourably raised not only by Malay opposition members such as Parti Islam Se-Malaysia (PAS) and Semangat 46 but by a member from UMNO. But the application of the quota system to private institutions was overtly opposed by both ruling and opposition Chinese parties (namely, MCA and DAP). Given these oppositions, the quota system was not introduced to private institutions.

Has the Government Control over Provision of Educational Services Gone?

Higher education reforms since the 1990s have dismantled the strict government ban over private sector involvement in higher education. Similarly, some shifts were seen in terms of the medium of instruction and curriculum, but student activities in politics and unions remain strictly banned at both public and private higher education institutions (Soda 2006). Most crucially, all these changes were introduced in accordance with the existing institutional framework of higher education, causing a dualistic structure in terms of the way in which higher education services are provided.

By principle, Bahasa Malaysia remains the medium of instruction at higher institutions, but there are some signs of changes from the NEP period. Though the consent of the Minister of Education is mandatory in all cases, the government allows the switch from Bahasa Malaysia to English. However, there is a clear difference between public and private higher education institutions. In the case of the former, the use of English is restricted to medicine and technical subjects alone (Alias 1997). By contrast, according to PHEIA, private higher education institutions can use other languages such as English to teach all subjects once approved by the Minister (Samuel and Lew 1997). Presumably, this public-private difference resulted from political awareness of the leaders, especially the then Prime Minister Dr Mahathir, who saw the importance of co-opting non-Bumiputeras since most of the newly constructed private institutions accommodated the educational demands from non-Bumiputeras (Lee 2004; Tan 2002). By the same token, using English as the medium of instruction was believed to be useful in terms of efficiency concerns since English learning would be more useful in securing employment (Lee 2004).

In contrast, the government control over curriculum or programs offered remains despite the introduction of the reforms. For example, the UUCA and PHEIA stipulate the final decision power resides with the Minister of Education with regard to curriculum or programs offered (Lee 1999; Tan 2002). In addition, NABA aims to set up an accreditation board to oversee the quality of private education (Lee 1999). Through analysis of ministerial speeches and documents as well as a number of interviews with educationalists, Tan (2002) similarly

argues that these legislations were “designed to open up access higher education on the one hand, and to place Malaysian private higher education under regulatory control with respect to quality and in compliance with the national education philosophy on the other (*ibid*, p. 81).”

Quite obviously, the government control over provision of higher educational services did not decline. For, the government did not quite touch upon the realm of the existing institutional framework constituted under the NEP. Rather, the reforms gave rise to a dualistic structure in higher education (in terms of access and provision of its services), as the result of preserving the existing environment. Naturally, there emerges a public-private divergence in the way in which higher education is provided (Wilkinson and Yussof 2005). In terms of access, all this suggests that Bumiputera students are likely to enrol public higher education institutions with equity concerns, non-Bumiputera private ones without them (see also Noran and Ahmad 1997 quoted in Tan 2002, p. 92; Pong 1995).

4.2.3 Ethnic Differentials in Higher Education Enrolment: Previous Findings

As the discussion so far suggests, the government intervention in higher education, which ostensibly aimed at maintaining social stability, has constituted the institutional context in which various ethnic groups make schooling decisions. It influences various elements of demands, determining outcomes of their schooling decisions. It seems obvious to see the Bumiputera (or Malay) advantage in enrolling public higher education institutions due to the quota system. In turn, it can be surmised that numerous non-Bumiputera students pursued overseas education during the NEP period, but switched to domestic private higher education from the mid-1990s. Clearly, this points to unequal access to higher education, which takes place due to the nature of higher education policy in Malaysia.

Table 4.2 presents the enrolment trend until 1988, after which similar data becomes unavailable. It reveals three interesting, but hardly surprising, findings. First, we can observe the advantage of Bumiputeras at local higher education institutions. Since the private higher education was strictly restricted during the

NEP period, it can tautologically follow that Bumiputeras constituted the majority group at public higher education institutions. For example, Bumiputera accounted for 53.7 percent of the total enrolments at domestic higher education institutions in 1970, but the share jumped to 65.3 percent in 1988.

Second, a number of Chinese and Indian students chose overseas education institutions, primarily due to the preferential treatment of the NEP (Young and Ng 1994). For Selvaratnam, many non-Bumiputera “candidates who are qualified on academic criteria to enter the country’s local universities were rejected on ethnic grounds and are therefore forced to seek an overseas higher education (Selvaratnam 1988, p. 189).” The total number of Malaysian students in overseas higher institutions amounted to 29,731 in 1980 (Malaysia 1984, Table 14-3), and it reached at 60,544 in 1988 (Malaysia 1989, Table 13-3). Yet, the dominance of non-Bumiputera students was evident. For example, 56.5 percent and 12.7 percent of the students studying abroad as of 1988 were Chinese and Indians respectively, while Malays accounted only for 29.8 percent (see Table 4.2). Throughout the 1980s, Chinese and Indians represented at least two-thirds of Malaysian students studying overseas.

Finally, one very interesting point can be found from Table 4.2. When combined all types of higher education (local and overseas) together, we can see the under-representation of Bumiputeras and the over-representation of Chinese in higher education enrolment. When looking at higher education irrespective of its type (i.e., domestic or overseas), Chinese and Indians accounted for 39.6 and 8.4 percent of the total enrollees in 1988 respectively (see the last row of Table 4.2). Indeed, the figure for Chinese is higher than the overall population share of around 31.8 percent (Malaysia 1989, Table 4-1). On the other hand, the Malay share of the total enrollees in 1988 was 51.2 percent, which was lower than the population share of 57.6 percent (*ibid*). This suggests that the Malay advantage in higher education enrolment, especially relative to Chinese, was absent during the NEP, when overseas higher education figures are accounted for.

Table 4.2 Distribution of Malaysian Students in Domestic and Overseas Higher Institutions by Ethnic Group and Level of Education, 1970, 1980, 1985 and 1988 (in percentile)

	1970					1980					1985					1988				
	B	C	I	O	T	B	C	I	O	T	B	C	I	O	T	B	C	I	O	T
Domestic	53.7	38.3	5.3	2.7	100	59.7	33.3	6.1	0.9	100	61.0	30.7	7.4	0.8	100	65.3	28.6	5.5	0.6	100
Overseas	n.a	n.a	n.a	n.a	n.a	24.2	62.1	12.9	0.8	100	24.2	62.0	12.9	0.8	100	29.8	56.5	12.7	1.0	100
TOTAL	n.a	n.a	n.a	n.a	n.a	45.9	44.5	8.8	0.8	100	51.7	38.7	8.8	0.8	100	51.2	39.6	8.4	0.8	100

Note: Data on overseas students are not available for 1970. B denotes Bumiputera, C Chinese, I Indian, O others and T total.

Source: Malaysia (1981, Table 21-3) for 1970, and Computed by author using Malaysia (1984, Table 14-3) and Malaysia (1989, Table 13-3) for 1980, 1985 and 1988.

The first two points are fairly obvious. In particular, the first point is consistent with the finding of Agadjanian and Liew (2005) that used MFLS-2 data and found the Malay advantage in post-secondary (including higher) education enrolment during the NEP period. However, the last point that emerged from Table 4.2 contradicts the finding of Agadjanian and Liew (2005). Part of the reason for this is the sample coverage of MFLS-2 (see also Table 3.1). It only covers Peninsular Malaysia and does not contain information on higher education enrolment. Indeed, the ethnic distribution of the sample used by Agadjanian and Liew (2005) does not represent the true population distribution. In their sample compiled in 1988, Malays accounted for 46.8 percent, Chinese 28.9 percent and Indians strikingly 24.3 percent. In fact, this sample under-represents Malays and over-represents Indians. For example, in 1991, Bumiputeras accounted for 61.3 percent of the total population (Malays 50.7 percent and other Bumiputeras 10.6 percent), and Chinese 27.5 percent and Indians 7.8 percent (Swee-Hock 2007 Table 5.2).⁴⁸ This coverage problem not only questions the credibility of their finding, but also points to the following hypothesis on the basis of Table 4.2:

Hypothesis 1: During the NEP, the Malay advantage in enrolling higher education, especially relative to Chinese, was absent when combining all types of higher education together, but Indians have lagged behind Malays in terms of higher education access.

Unfortunately, it is impossible at this stage to depict the ethnic distribution of higher education enrolees after 1988 since all Malaysia Plans after Malaysia (1989) stopped publishing the figures given in Table 4.2. There are no studies in the literature that have examined this, but the next section will be the first attempt to look into the hypothesis using a representative data set.

Further, section 4.2.2 showed that the reforms from the mid-1990s started to allow private sector involvement in higher education, thereby increasing opportunities. Aihara (2009) found that the main beneficiaries of the private sector involvement were non-Bumiputeras, and that they accounted for around

⁴⁸ The rest are other Malaysian citizens.

80 percent of the enrollees at private higher education institutions. Since private higher education institutions played a large part in increasing the number of enrolment, we can surmise, in relation to the first hypothesis, the following hypothesis:

Hypothesis 2: In the 1990s, the ethnic differentials in higher education enrolment, especially Malay-Chinese and Malay-Indians, reversed or narrowed.

The empirical investigation of this hypothesis, together with the first one, enables us to depict the time-series trend of the ethnic differentials, which has never been done in the literature.

The empirical study that follows is the first attempt in the literature to examine ethnic differentials in higher education enrolment from the NEP period until 2000. Nonetheless, some notes on public-private choice in higher education must be made before proceeding. Numerous studies have pointed to the ethnic differences in enrolment pattern between public and private streams in the 1990s, but without concrete evidence (for example, Alias 1997; Lee 1996, 1999, 2004; Samuel and Liew 1997; Tan 2002). This is another crucial issue to examine, but the rest of this chapter does not treat it since it is more concerned with higher education enrolment in general. Instead, Chapter 6 examines the public-private choice in higher education together with the public-private employment choice, in order to complement the findings of this chapter.

4.3 Empirical Strategy

4.3.1 Data

The rest of this chapter is based on empirical analysis of the two percent random sample of *Population and Housing Census Malaysia 2000*, and aims to test the two hypotheses established above.⁴⁹ The census data was released from

⁴⁹ Hirschman (1972, 1979) used the two percent random sample of *Population and Housing Census Malaysia 1957* and *1970* respectively, but did not look at higher education enrolment.

the Department of Statistics (DOS) on November 2006 for the purpose of this study. The original size of the sample is 435,300 individuals.

The census data is collected every ten years, and there have been five censuses from the country's Independence. It is representative nationally, and stands out from other surveys such as MFLS-2 in that it covers both Peninsular and Borneo (see also Table 3.1). What the government calls 'the Census day' was 5 July 2000, and all individual information was collected according to their usual place of residence rather than the place on the night of the Census day. Further, individual records were collected in hierarchical way: starting with enumeration block, living quarter, household and then individuals (Department of Statistics 2000a).

The present data set is given in three separate forms: living quarter, household and individual sample tapes. The living quarter and household sample tapes include current information on various physical facilities of houses and living materials. On the other hand, the individual sample tape contains current information on socio-economic backgrounds of residents, ranging from educational backgrounds, labour force and employment status. Unfortunately, income and expenditure data are not included in this census data.⁵⁰

I attempted to integrate the three samples by creating an identifier and matching them with it. However, it was unsuccessful since the data was inserted differently between Peninsular Malaysia and Borneo. On the one hand, the Peninsular data is divided by each living quarter, under which the household and individual data are listed. On the other hand, the Borneo data is not done so. Several living quarters are listed altogether, followed by all households and then individuals. This makes it impossible to match each living quarter with household and individuals in the Borneo case. This problem with the Borneo data cannot be solved since the raw information was not made available by the DOS.

⁵⁰ The release of these data was rejected due to sensitivity.

Rather than integrating the three samples, therefore, it seems more reasonable to use the individual sample. There is a reason to justify it. The living quarter and housing samples contain only current information at the time of census. In contrast, schooling decisions were already made before the time of census. Therefore, inclusion of the two sample tapes can cause serious endogeneity since the facilities and living materials at the time of census may well be the consequences rather than causes of schooling decisions. Thus, we stick to the individual sample which can still allow us to look into the entire nation, including Borneo that has long been outside the attention of study in the literature.

The individual sample tape includes a wide range of residents. But we focus on Malaysian citizens born in Malaysia, and on the three major ethnic groups: Malays, Chinese and Indians. The three ethnic groups still constitute around 90 percent of all Malaysian citizens. The reason for focusing on Malaysians born in Malaysia is that those born overseas are highly likely to enrol in overseas education and are outside the scope of the NEP. In contrast, Malaysia-born citizens may have chosen domestic or overseas higher education in response to the NEP, or decided not to enrol higher education. Since the primary focus of this empirical study is to look into how the domestic population reacted to government policy and thus the ethnic differentials in access to higher education, it is useful to control for this from the beginning.

Further, we focus on those who are between 20 and 49 years old at the time of census. Following King and Lillard (1987) and Pong (1993) who examined the effects of government preferential policy on (upper) secondary school attainment, the sample is divided into several age cohorts. In particular, we construct six five-year cohorts: 20-24, 25-29, 30-34, 35-39, 40-44 and 45-49. When and where necessary, these cohorts are made into three ten-year cohorts, namely 20-29, 30-39 and 40-49, in order to highlight the effects of the NEP on schooling decisions.

The selection of these age cohorts is based on three reasons. First, those above 20 years old are eligible to enrol higher education, either domestic or overseas (see Ministry of Education 2000). Thus, it is assumed for analytical purposes that

individuals enrol in higher education at the age of 20. Second, 50 years is generally the retirement age of women in Malaysia, although men's retirement age by 2000 was 55 years old. This allows us to cover the working age population. Finally, and very importantly, those between 30 and 49 years are assumed to have entered higher education during the NEP era (1971-1990) since they were born between 1951 and 1970. This makes it possible to analyze the effects of government policy on enrolment by comparing them with the younger cohort (20-29 years old).

Nonetheless, there remains a question of selectivity bias in the data sets. Some Chinese and Indians, having enrolled overseas higher education and continued to stay overseas, are excluded from the data set. This bias may be larger for the older than the younger cohorts, in light of government policy during the NEP period. However, this bias can not be overcome by the present data per se, and the absence of relevant empirical materials in the literature makes it more difficult to ascertain the magnitude of the bias. Thus, some reservation must be made when interpreting the results for the older cohorts.

Above all, the sample size is reduced to 140,551 individuals, and the ethnic distribution is 58.7 percent for Malays, 31.9 percent for Chinese and 9.3 percent for Indians (Table 4.3). Needless to say, this ethnic breakdown is totally different to the one of Agadjanian and Liew (2005), where Malays accounted for 46.8 percent, Chinese 28.9 percent and Indians 24.3 percent. Given the fact that the Census data is the source of data on population distribution in government publication, the present data must be judged more reliable in terms of sample coverage than the MFLS-2.

Table 4.3 The Sample Distribution by Ethnicity

	Frequency	Percent
Malays	82,562	58.7
Chinese	44,876	31.9
Indians	13,113	9.3
TOTAL	140,551	100.0

4.3.2 Estimation Strategy

The previous studies on the probability of educational access in Malaysia employed a logit model, either a binary logit (Agadjanian and Liew 2005; Pong 1993) or a multinomial logit (Sudha 1997).⁵¹ Nonetheless, it is only Agadjanian and Liew (2005) who analysed the transition to post-secondary schooling, including higher education. They used a binary logit model with a dichotomous variable that equals 1 if you have entered post-secondary education given the completion of upper secondary education and 0 if not. For this reason, I follow a similar method and aim to update the findings on higher education enrolment.

With a dichotomous variable as the dependent variable, the Ordinary Least Squares (OLS) yield inefficient estimates due to the following assumptions (Gilbert 1993; Hosmer and Lemeshow 2000; Maddala 1983, 2001). First, it is assumed that the error term has a constant variance. When the dependent variable is dichotomous, however, it is violated since the error term does not follow normal distribution. Consequently, the coefficient estimates are no longer the best linear unbiased (BLUE). Second, it is assumed that the dependent variable takes any values on the real line, which is inconsistent with the nature of a dichotomous variable of taking either 0 or 1. A dichotomous variable follows an extreme value distribution rather than normal distribution, with the latter being assumed in the OLS estimates. Hence, a logit model uses the maximum likelihood estimators that yield smaller standard errors in the case of non-constant variance of the binary outcome (Agresti 2002).

Consider the following probability of one's enrolling higher education⁵²:

$$\pi = \frac{\text{Exp}(\alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_j x_j)}{[1 + \text{Exp}(\alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_j x_j)]} \quad (4.1)$$

⁵¹ King and Lillard (1987) did not look into the probability of educational access in econometric form. Rather, they generally looked at the pattern of high school enrolment rates through descriptive analysis of age cohort. Hence, as is the same with the present chapter, they used age cohort to capture the effects of government policy on enrolment pattern.

⁵² This paragraph is written with reference to Long and Freese (2006, pp. 177-181).

Let $\frac{\pi}{1-\pi}$, which is the odds of the two probabilities, be denoted by Ω . Take the natural logarithm of the odds, namely logit, and the equation (4.1) can be written in the following linear form:

$$\ln\left(\frac{\pi}{1-\pi}\right) = \ln \Omega(X) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_j x_j \quad (4.2)$$

where $X = \sum x$. The logit model helps us to describe the effects of each explanatory variable on the dependent variable. This is particularly so because it yields odds ratio by transforming the above regression. By taking the exponential of the equation (4.2) with regard to both x_1 and x_1+1 (a unit increase), holding all others constant, and then dividing them, we get the odds ratio:

$$\frac{\Omega(X, x_1 + 1)}{\Omega(X, x_1)} = \frac{e^\alpha e^{\beta_1(x_1+1)} e^{\beta_2 x_2} \dots e^{\beta_j x_j}}{e^\alpha e^{\beta_1 x_1} e^{\beta_2 x_2} \dots e^{\beta_j x_j}} = e^{\beta_1}$$

It means that a unit change in x_1 leads to a change in the odds through $\exp(x_1)$. The STATA package reports odds ratios for each explanatory variable together with the 95 percent confidence interval.

Indeed, the property of logistic regression in obtaining odds ratio is extremely useful in looking into the ethnic differentials in higher educational enrolment. By comparing odds ratios for Chinese and Indians, for example, it becomes easy to investigate the inter-ethnic (or between-group) differences in the probability of enrolling higher education.

At this stage, it must be stressed that the purpose of this empirical study is not to find the 'best fitted' econometric model to support any theory. Indeed, the potential data deficiencies in terms of the number of available variables make it difficult to do so. Rather, it aims to examine the trends of ethnic differentials in higher educational enrolment by illustrating the effects of various factors like ethnicity on the probability of enrolling higher education institutions. As

mentioned earlier, the government publications and the previous studies treated the NEP period, but left the 1990s unanalyzed. This is where this study has something to offer by using the similar method to them. While ascertaining the ethnic differentials, emphasis is also put on their historical trend with reference to the NEP period and the 1990s. This enables us to observe the effects of government policy shifts on enrolment decisions of each ethnic group.

4.3.3 Variables

The variables used for the present empirical study and their definitions are presented in Table 4.4. The dependent variable for the present study is a dichotomous variable indicating whether or not you have entered higher education given the completion of upper secondary education: it equals 1 if you have done so and 0 otherwise.

The explanatory variables indicate individuals' characteristics. CHN and IDN are ethnic dummies representing whether you are Chinese or Indians, with Malays the reference group. GENDER is also a dummy variable equalling 1 if female and 0 if male. There are also five age cohort dummies, indicating 1 if the individual belongs to the cohort and 0 if not. The reference group is set for the youngest 20-24 age cohort. We also have four geographical dummies that can, albeit roughly, represent economic backgrounds of individuals. With reference to Malaysia (2001, Tables 5.1 and 5.3), they are classified into KL & Selangor, BORNEO, NORTH, SOUTH and WEST. According to it, KL & Selangor, which is the reference group, is the richest region in terms of per capita GDP, followed by WEST, SOUTH, NORTH and BORNEO.⁵³

The selection of variables was done by reference to both previous studies and constraints of the present data. By employing ethnicity, gender, age, and family backgrounds such as parental education and income, Lillard and Willis (1993), Pong (1993, 1995) and Sudha (1997) investigated secondary school attainment, and Agadjanian and Liew (2005) post-secondary education including higher

⁵³ I used data from Malaysia (2001, Tables 5.1 and 5.3) and computed the average per capita GDP of these regions (in RM million): 24,045 for KL & Selangor, 17,326 for WEST, 13,210 for SOUTH, 12,239 for NORTH, and 10,939 for BORNEO.

education.⁵⁴ However, due to data constraints, there is one noticeable difference between these studies and my study: no variables on family backgrounds are employed here. This is because the present data sets do not contain information on parental socio-economic backgrounds such as education, occupation and income. Yet, the four geographical dummies are additionally included as explanatory variables in order to roughly see the effect of economic backgrounds on higher education enrolment decisions.

⁵⁴ They all used MFLS-2.

Table 4.4 Summary Statistics of Variables

<i>Variables</i>	<i>Description</i>	<i>Mean (Std Dev)</i>
Ethnicity		
Malay*	1 if Malay, 0 otherwise	0.587 (0.492)
Chinese	1 if Chinese, 0 otherwise	0.319 (0.466)
Indians	1 if Indian, 0 otherwise	0.093 (0.291)
Gender		
Male*	1 if male, 0 otherwise	0.504 (0.500)
Female	1 if female, 0 otherwise	0.496 (0.500)
Age Cohort		
20-24*	1 if aged between 20-24, 0 otherwise	0.189 (0.391)
25-29	1 if aged between 25-29, 0 otherwise	0.181 (0.385)
30-34	1 if aged between 30-34, 0 otherwise	0.176 (0.381)
35-39	1 if aged between 35-39, 0 otherwise	0.174 (0.379)
40-44	1 if aged between 40-44, 0 otherwise	0.155 (0.362)
45-49	1 if aged between 45-49, 0 otherwise	0.124 (0.330)
Birthplace		
KL & Selangor*	1 if born in Kuala Lumpur or Selangor, 0 otherwise	0.124 (0.330)
Borneo	1 if born in Borneo states (Sabah, Sarawak or Labuan), 0 otherwise	0.085 (0.278)
Northern	1 if born in northern states (Kedah, Perlis, Kelantan or Trengganu), 0 otherwise	0.233 (0.423)
Southern	1 if born in southern states (Johor, Pahang, Melaka or Negri Sembilan), 0 otherwise	0.284 (0.451)
Western	1 if born in western states (Penang or Perak), 0 otherwise	0.223 (0.416)

Note: * indicates the reference group

4.4 Empirical Results

4.4.1 Descriptive Results

Table 4.5 shows higher education enrolment by ethnicity and the results of Chi-squared test. 14.1 percent of those between 20 and 49 years old have enrolled in higher education, and, as expected, there are ethnic differences. Chinese marked the highest of 16 percent, followed by Malays (13.7 percent) and Indians (10.3 percent). And the test statistics clearly indicate that the two variables are associated. Nonetheless, these findings must be investigated further since they do not control for other elements such as gender and age cohort effects. Indeed, in the Malaysian context, the age cohort effects must be adequately captured since the impacts of government policy on schooling decisions are substantial.

Table 4.5 Higher Education Enrolment by Ethnicity

	Enrolled Higher Education		Total
	<i>Yes</i>	<i>No</i>	
Malays	13.7	86.3	100.0
Chinese	16.0	84.0	100.0
Indians	10.3	89.7	100.0
TOTAL	14.1	85.9	100.0

Chi-square	DF	Value	Probability
Pearson	2	296.4	.000
Likelihood Ratio	2	306.2	.000

Table 4.6 breaks down the proportion of higher educational enrolment by ethnicity and gender, and presents two interesting, but hardly surprising, results. First, there is a gender difference, though not necessarily substantial. The proportion of those having entered higher education is higher for men than women, and this trend applies with all the ethnic groups. Second, it should also be pointed out that, regardless of gender, the Chinese enrolment ratios are highest, followed by Malays and then Indians. For example, the enrolment ratio of

Chinese women is higher than that of Malay men, and the enrolment ratio of Malay women is higher than that of Indian men.

Table 4.6 Higher Education Enrolment by Ethnicity and Gender

		Enrolled Higher Education		Total
		<i>Yes</i>	<i>No</i>	
Malays	Male	14.7	85.3	100.0
	Female	12.7	87.3	100.0
Chinese	Male	16.7	83.3	100.0
	Female	15.2	84.8	100.0
Indians	Male	11.4	88.6	100.0
	Female	9.1	90.1	100.0
TOTAL	Male	15.1	84.9	100.0
	Female	13.2	86.8	100.0

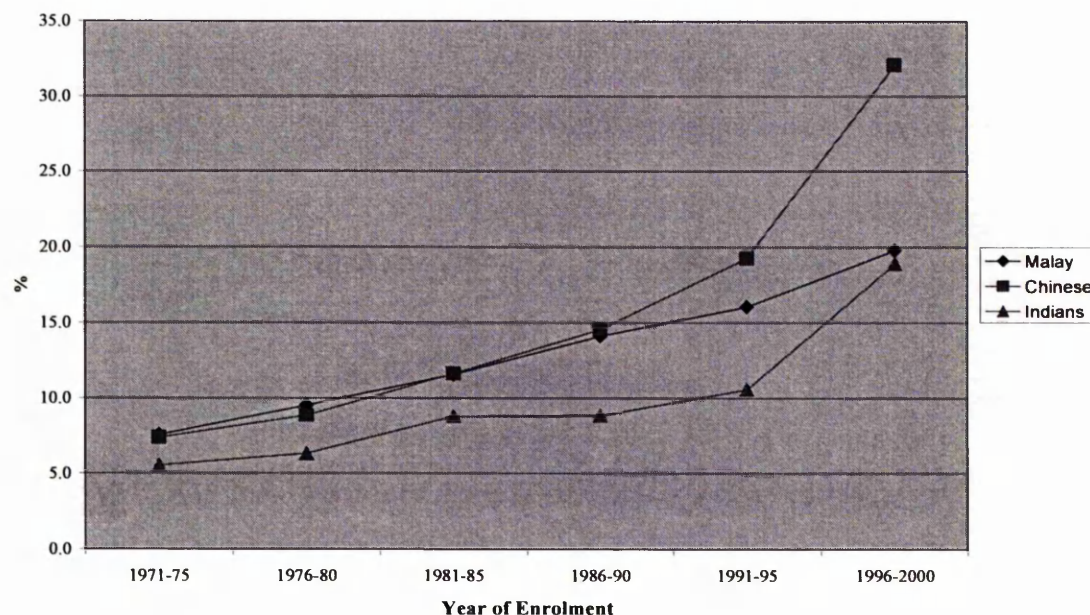
Significantly, the Chinese advantage in enrolling in higher education visible in Table 4.5 can not necessarily be found during the NEP period. It is seen from Figure 4.1. Overall, higher education enrolment expanded rather gradually during the NEP period, and the Chinese enrolment ratio was almost at par with Malay's between 1971 and 1990. This seems consistent with our earlier findings from Table 4.2, but inconsistent with Agadjanian and Liew (2005). In contrast, when the NDP was put in place in 1991, the Chinese enrolment ratio started to increase from the mid-1990s. In effect, the proportion of Chinese who enrolled in higher education exceeded 30 percent by 2000. Similarly, Indians started to increase their enrolment ratio after 1991, but still lagged behind Malays.

This Malay-Chinese reversal can be understood by considering the policy shifts in the 1990s. As mentioned earlier, the liberalisation moves started to flow over to the terrain of higher education from the late 1980s, and they finally led to a series of higher education reforms in the 1990s. It can be easily surmised that many of Chinese and Indian students opt for private rather than public streams since the latter applies the ethnic quota system. Using the same data source, for example, Aihara (2009) found that around 80 percent of the students at private higher education institutions were non-Bumiputeras while Bumiputeras

accounted for 70 percent of the total students at public higher education institutions.

Above all, Table 4.5 masks the opposing associations found in Figure 4.1 since it does not control for the policy effects. Instead, it can be argued that the ethnic association with higher educational enrolment is influenced by age cohort reflecting the changing effects of government policy. Putt differently, the association between higher educational enrolment and ethnicity varies according to age cohort.

Figure 4.1 Trend of Higher Education Enrolment by Ethnicity



4.4.2 Estimation Results: Between-Group Differences

Given the findings from Figure 4.1, I first estimate the equation (4.2) for the whole sample and then for three separate age cohorts: 20-29 years old, 30-39 years old, and 40-49 years old. The latter two cohorts were the schooling-going cohorts during the NEP period, but the youngest cohort during the 1990s. Then, I compare the odds ratios across these cohorts and capture the impacts of government policy on enrolment decisions with reference to ethnicity.

The result of the logistic regression (4.2) estimated for the whole sample is presented in Table 4.7.⁵⁵ All explanatory variables are statistically significant at $p < .01$, and the log likelihood test rejects the null hypothesis that the coefficients on all the explanatory variables are jointly zero.⁵⁶ It can be argued that they have effects on higher educational enrolment.

Three findings are immediately clear. First, there are ethnic differences in higher educational enrolment. Chinese were 25 percent more likely to enrol in higher education than Malays, whereas Indians around 30 percent less likely to do so. As elaborated later, this Malay-Chinese difference may not be surprising in light of the shifting higher education policies over the three decades. It will be found later that the Chinese advantage started to appear in the 1990s whereas the Indian persistently lagged behind Malays in terms of the likelihood of enrolling in higher education. Second, there is a gender difference as well. Women are around 15 percent less likely to enrol than men. Again, it will be found later that the gender gap has narrowed over time and women outstripped men in the 1990s. Third, expansion of higher education over time can be confirmed by the five age cohort dummies. For example, the 45-49 cohort dummy indicates that higher education opportunities increased by four-fold from early 1970s, and the 30-34 dummy that they doubled from late 1980s.

These findings from Table 4.7 are fairly consistent with our arguments developed earlier, but it is necessary to break them down to depict the effects of government policy on schooling decisions. In particular, when considering the ethnic differentials in relation to the NEP, logistic regressions are estimated for three separate cohorts (see also Figure 4.1). Table 4.8 shows the results. For each cohort, two models were estimated. Since the sample is already controlled by age cohort, I exclude age-related variables. The restricted model includes ethnicity and gender dummies, and the reference group is Malay men. The full model

⁵⁵ Long and Freese (2006, p. 181) note that when reporting odds ratios rather than coefficients, the 95% confidence interval of them is reported instead of the standard error.

⁵⁶ There is no unique standard with which to choose a hypothesis test of coefficients, but statisticians seem to prefer the log-likelihood test to Wald-test (Long and Freese 2006, p. 145).

includes all the variables in the restricted model and further adds birthplace dummies. The reason for doing so is that birthplace dummies can, though roughly, reflect socio-economic elements as well as proximity to higher education institutions. The reference group for the full model is Malay men born in Kuala Lumpur or Selangor.

Table 4.7 Result of the Logistic Regression for the whole sample (odds ratios)

<i>Variable</i>	
Ethnicity	
Chinese	1.25 (1.21, 1.29)
Indians	0.73 (0.68, 0.77)
Gender	
Female	0.84 (0.81, 0.87)
Age Cohort	
25-29	0.65 (0.62, 0.68)
30-34	0.52 (0.50, 0.55)
35-39	0.42 (0.40, 0.44)
40-44	0.32 (0.30, 0.34)
45-49	0.25 (0.24, 0.27)
Log likelihood test	
G-squared	3714.17
<i>p</i> -value	0.00
N. of Sample	140,551

All significant at $p < .01$.

Figures in parentheses are the 95 percent confidence interval.

As seen from Table 4.8, the inclusion of the birthplace variables reduces the odds ratios of Chinese and Indian dummies. In particular, the magnitude of the change is largest for the youngest cohort. Rather surprisingly, this suggests that birthplace, which is the proxy for economic backgrounds of individuals, has become more important in determining higher education enrolment. On the other hand, the inclusion of those variables hardly changes the odds of the female

dummy. Despite these findings, more interesting results can be found when looking specifically at ethnicity, gender and birthplace.

First of all, there exist the ethnic differentials in higher educational enrolment, although their magnitudes vary between Chinese and Indians. Equally importantly, it can be also found that government policy affects the schooling decisions of each ethnic group very differently.

During the NEP period, the Malay-Chinese difference was overall insignificant, whereas the disadvantage of Indians relative to Malays is significant (columns 1-4). Putting all types of higher education together, the Malay advantage in entering higher education is not evident, at least in comparison to Chinese. This finding supports Hypothesis 1, being consistent with Table 4.2. This finding is hardly surprising since a large number of Chinese students chose overseas education in response to the NEP.

The findings for the 1990s support Hypothesis 2. The odds ratio for Chinese is statistically significant, and their likelihood of enrolling in higher education exceeded that of Malays (see columns 5-6). They are around 50 percent more likely to enter higher education. This result coincides with higher education reforms in the 1990s, indicating that more Chinese now choose private streams of higher education without ethnic concerns while Malays choose public streams. On the other hand, Indians have persistently lagged behind, irrespective of government policy shifts in the 1990s. Although the gap with Malays has gradually narrowed over time, their disadvantage is still in the range of 20-30 percent (columns 5-6). Above all, access to higher education is not equal given these ethnic differentials, and it is highly influenced by government policy.

Secondly, the persistence of gender differences can be seen. Female disadvantage in entering higher education was seen during the NEP period. They were around 45 percent less likely to attend higher education in the 1970s (columns 1-2), and more or less 30 percent in the 1980s (columns 3-4). However, women outstripped men in the 1990s. In spite of the small margin, they are now

more likely to enrol in higher education (columns 5-6). Thus, this clearly points to the changing enrolment pattern of women.

Some tentative reasons for changing trends of women's enrolment pattern can be considered, though comprehensive research on this topic is required in the future. One reason can be different fertility rates, which influence the proportion of women in the cohorts. However, a population economist, Swee-Hock (2005, Chapter 6), reports the male-dominated population structure in Malaysia, which requires us to consider another reason. In this regard, more reasonable reason can be that higher education expansion as well as social transformation with economic growth over time prompted more women to pursue higher education. Obviously, the investigation of this statement demands more detailed data sets that contain household-level as well as individual-level information. Yet, it is impossible to ascertain this issue at this moment, due to the deficiencies of the present data sets, such that this issue can be a future research topic. Nonetheless, it must be highlighted that access to higher education is in general uneven along gender lines as well. Although gender is not the primary policy target in Malaysia's higher education, these findings complement the earlier findings on the ethnic differences.

Finally, the odds ratios of the four birthplace dummies, which roughly represent economic backgrounds of individuals, are all statistically significant, meaning that they have effects on higher educational enrolment. Generally, it is indicated that those born in Kuala Lumpur or Selangor have enjoyed more access to higher education. In general, it can be stated that economic backgrounds influence higher educational enrolment.

It is also found that the effects of being from Kuala Lumpur or Selangor have become more evident in the 1990s. Columns 2 and 4 reveal slightly increased effects of birthplace on the binary outcome. By the 1980s, for example, those born in Borneo states were 40 percent less likely to enrol higher education than those in Kuala Lumpur or Selangor. Even those from other states were also disadvantaged by the range of 15 to 20 percent. On the other hand, column 6 demonstrates that those born in Kuala Lumpur or Selangor are even more

advantaged in accessing higher education. This suggests that the newly expanded opportunities in the 1990s are not equally enjoyed by the public and may be created in the developed states. For example, Lee (1999) points out that more or less half of the private institutions were concentrated in Kuala Lumpur or Selangor area.

Indeed, these results suggest the existence and persistence of not only inter- but intra-ethnic difference in higher education enrolment (see also Aihara 2009; Tzannatos 1991). Malay men born in Kuala Lumpur or Selangor are more likely to move on to higher education than, for example, those from Northern states. At the same time, they indirectly point to intergenerational reproduction of educational backgrounds. For, those having attained higher education are likely to reside in the developed states, such as Kuala Lumpur or Selangor, since there are a number of employment opportunities rewarding their educational backgrounds. That being the case, those staying in the less developed states can continue to have less access to higher education.

The present data sets do not allow me to further investigate these issues since, as mentioned in section 4.3, it does not contain individual data on income and expenditure. Nonetheless, the findings on birthplace strengthen rather than weaken our arguments that access to higher education in Malaysia is not necessarily equal for all. Contrary to human capital theory, access to higher education in Malaysia is institutionally arranged in favour of Malays. The ethnic differences in terms of higher education enrolment are evident, and they are indeed intensified by other factors.

Table 4.8 Results of the Logistic Regression for Three Separate Age Cohorts (Odds Ratios)

	Age cohort 40-49 (Enrolled 1971-1980)	Age cohort 30-39 (Enrolled 1981-1990)	Age cohort 20-29 (Enrolled 1991-2000)			
	(1)	(2)	(3)	(4)	(5)	(6)
Ethnicity						
Chinese	0.94* (0.87, 1.01)	0.94 (0.86, 1.02)	1.01 (0.96, 1.07)	1.00 (0.94, 1.06)	1.59*** (1.02, 1.11)	1.45*** (1.38, 1.52)
Indians	0.67*** (0.58, 0.77)	0.64*** (0.55, 0.74)	0.65*** (0.59, 0.73)	0.61*** (0.55, 0.68)	0.81*** (0.74, 0.88)	0.69*** (0.63, 0.75)
Gender						
Female	0.56*** (0.52, 0.60)	0.55*** (0.51, 0.60)	0.72*** (0.68, 0.76)	0.72*** (0.68, 0.76)	1.06*** (1.02, 1.11)	1.07*** (1.02, 1.11)
Birthplace						
Borneo		0.70*** (0.59, 0.82)		0.61*** (0.54, 0.68)		0.53*** (0.48, 0.58)
Northern		0.86** (0.76, 0.97)		0.79*** (0.72, 0.86)		0.58*** (0.54, 0.62)
Southern		0.84*** (0.75, 0.94)		0.84*** (0.78, 0.91)		0.67*** (0.63, 0.71)
Western		0.86*** (0.76, 0.96)		0.81*** (0.74, 0.88)		0.71*** (0.67, 0.76)
Log likelihood test						
G-squared	275.56	295.74	212.30	287.53	471.88	806.65
p-value	0.00	0.00	0.00	0.00	0.00	0.00
N. of Sample	39,316	39,316	49,226	49,226	52,009	52,009

Figures in parentheses indicate the 95% confidence interval of the odds ratios.

*** $p < .01$, ** $p < .05$, * $p < .10$.

4.4.3 Estimation Results: Within-Group Differences

While having estimated the effects of ethnicity on higher education enrolment, we have also pointed to those of gender and birthplace. Though some caveats ought to be made due to the deficiencies of the present data sets, logistic regressions were separately estimated for Malays, Chinese and Indians in order to see within-group differences. Table 4.9 presents the results. Most of the explanatory variables are statistically significant at $p < .01$, and the log likelihood test rejects the null hypothesis that the coefficients on all the explanatory variables are jointly zero.⁵⁷ They have effects on higher educational enrolment respectively.

Three major points are found from the table. First, hardly surprisingly, there are clear gender differences in higher education participation. For all the three groups, women have less access to higher education than men. As discussed in section 4.4.2, the question of why gender differences exist within each ethnic group should be addressed in future research. Next, it is seen from the coefficients on age cohort dummies that access to higher education has broadened over time for Malays, Chinese and Indians. Importantly, however, the speed at which higher education has become accessible over time differs among the ethnic groups. Compared to Malays, for example, it can be said that Chinese and Indians benefited more from the higher education reforms in the 1990s. Chinese aged between 20 and 24 are twice as likely to enrol in higher education as those between 25 and 29 years old. The same tendency applies of Indians. Further, the older Chinese and Indians were far less likely to attain higher education. All this suggests that there is a large gap in terms of educational access between the young and older non-Bumiputeras. In contrast, it is seen that the gap for Malays is not as large as the one for non-Bumiputeras, primarily because of the NEP regime in favour of Malays.

⁵⁷ There is no unique standard with which to choose a hypothesis test of coefficients, but statisticians seem to prefer the log-likelihood test to Wald-test (Long and Freese 2006, p. 145).

Table 4.9 Results of Separate Logistic Regressions by Ethnicity (Odds Ratios)

	Malays	Chinese	Indians
Gender			
Female	0.83*** (0.80, 0.86)	0.87*** (0.83, 0.92)	0.77*** (0.69, 0.86)
Age Cohort			
25-29	0.79*** (0.74, 0.83)	0.51*** (0.47, 0.55)	0.51*** (0.43, 0.60)
30-34	0.67*** (0.63, 0.71)	0.36*** (0.34, 0.39)	0.42*** (0.35, 0.50)
35-39	0.53*** (0.50, 0.57)	0.28*** (0.26, 0.31)	0.42*** (0.35, 0.50)
40-44	0.43*** (0.40, 0.46)	0.21*** (0.19, 0.23)	0.29*** (0.24, 0.36)
45-49	0.33*** (0.30, 0.36)	0.17*** (0.15, 0.19)	0.25*** (0.20, 0.32)
Birthplace			
Borneo	0.43*** (0.39, 0.48)	0.72*** (0.66, 0.78)	1.24 (0.52, 3.00)
Northern	0.63*** (0.59, 0.67)	0.88** (0.78, 0.98)	0.69*** (0.54, 0.87)
Southern	0.73*** (0.69, 0.78)	0.73*** (0.68, 0.78)	0.80*** (0.69, 0.92)
Western	0.69*** (0.64, 0.74)	0.84*** (0.78, 0.90)	0.87** (0.75, 1.00)
Log likelihood test			
G-squared	1562.97	2295.87	306.44
p-value	0.00	0.00	0.00
N. of Sample	82,562	44,876	13,113

Note: Figures in parenthesis are the 95% confidence interval of the odds ratios;
*** $p < .01$, ** $p < .05$.

Finally, it is found that for all the three groups those born in Kuala Lumpur or Selangor are the most advantaged in terms of educational access. More importantly, we can see that the within-group difference is larger for Malays than Chinese and Indians. Indeed, Malays born in Borneo states are more than 50 percent less likely to participate in higher education as those born in Kuala Lumpur or Selangor. Also, Malays born in Kuala Lumpur or Selangor are 30-40 percent more likely to enrol in higher education than those in Northern, Southern and Western states. This result for Malays is surprising since it indicates larger within-group differences than are found in the Chinese and Indian cases. Indeed,

for both Chinese and Indians, those born in Kuala Lumpur or Selangor are most likely to access higher education, but the gaps between the most advantaged and the least advantaged are narrower than the case of Malays. Unfortunately, the present data set does not contain information on socio-economic backgrounds of individuals so that it is impossible to further investigate this issue. Nonetheless, these findings are significant on their own, and call for more detailed examination of within-group differences in the future.

4.5 Conclusions

As far as higher education is concerned, the main thrust of the NEP was to resolve ethnic imbalance in higher educational enrolment, thereby contributing to improved socio-economic balance. Accordingly, the equity concerns exemplified in the NEP laid the firm foundation on which higher education policies were made and implemented, constituting the institutional framework further consolidated by the ethnic quota system and the government control over provision of higher education services. All this has made up the fundamental environment in which various ethnic groups made schooling decisions differently and ethnic differences in enrolment pattern emerged.

When the NDP replaced the NEP in 1991 and the higher education reforms were introduced from the mid-1990s, the situation has intrinsically remained unchanged. The reason for this was that the new changes, such as private sector involvement, were additionally made in accordance with the existing framework. The public higher education institutions remain concerned with equity considerations, whereas the private ones are free from them. Consequently, the reforms gave rise to a dualistic structure within the realm of higher education, and the equity-efficiency trade-off now manifests itself as the public-private differentials in higher education.

The empirical analysis using the *Population and Housing Census Malaysia 2000* revealed some interesting findings. The Malay advantage in enrolling in higher education during the NEP, especially relative to Chinese, is absent when

treating all types of higher education together. From the 1990s, the enrolment ratios of Malays, Chinese and Indians all increased, but at different speeds. Chinese have outstripped Malays in terms of the likelihood of entering higher education, reversing the ethnic differentials. On the other hand, Indians have narrowed the gap with Malays, but continued to lag behind Malays. It can be surmised that the reason for these resulted from the nature of the higher education reforms. This in turn makes it necessary to explicitly investigate the ethnic differentials in public-private choice in higher education, to which Chapter 6 returns.

While having demonstrated the ethnic differentials that are not presumed by human capital theory (see also Chapters 2 and 3), it was also found that gender and birthplace played crucial roles in determining higher education enrolment. In particular, the empirical findings suggest that they have gained more significance over the 1990s. These points are beyond the purpose of this research that focuses on ethnicity, but can be important future research topics to look into.

Chapter 5

Labour Markets: Ethnicity and Sector Selection

5.1 Introduction

The previous chapter found the persistence of the ethnic differentials in higher education enrolment over time, and suggested that there is the association between ethnicity and type of higher education (namely, public or private/overseas higher education). In the light of all this, this chapter proceeds to the study of the ethnic factor in labour market contexts, and particular concern is to investigate how inter-ethnic concerns are built into labour market policies and influence labour market decisions of various ethnic groups.

The interaction of ethnicity with government policy is of paramount importance in the context of Malaysia's labour markets (see also Chapter 3). Government intervention after the introduction of the NEP mirrors social, political and economic conditions so that the fundamental concern in labour markets is to strike a balance between inter-ethnic distribution (equity) and economic growth (efficiency). Naturally, then, this efficiency-equity trade-off sets the core foundation for the institutional framework of labour markets. Employment practices and fringe benefits in the public sector are arranged in favour of Malays due to equity concerns, whereas the private sector is expected to expand the economic pie to distribute. Thus, the equity-efficiency trade-off in labour markets constitutes the environment in which public-private differentials emerge, affecting the sector selection decisions of various ethnic groups. Indeed, it will be seen later that there is a clear association between ethnicity and specific sectors of employment (i.e., public and private sectors).

Previous studies have indicated that Malays constitute the majority of public sector employees (Abdullah Sanusi, Mansor and Abdul Kuddus 2003; Aziz, Buan and Singh 1987; Lucas and Verry 1999; Salleh and Osman-Rani 1991). However, there is no comprehensive study that looks into the association between ethnicity and public-private choice in the Malaysian context. This is

where this chapter has something new to offer. It is the first attempt to examine this issue through a combination of the political-economic approach with empirical analysis of the *Population and Housing Census Malaysia 2000*.

As is the previous chapter, some notes must be made at this juncture to avoid misunderstanding. The analytical thrust of this chapter is not to apply and/or develop human capital theory and remedy its analytical deficiencies. Rather, this chapter is devoted to investigating the peculiarities of Malaysia's labour markets by putting the role of the government to the fore. This allows us to start with the position that Malaysia's labour markets do not work as the human capital theory suggests. By taking the political-economic approach, it becomes possible to understand how and why, despite the same educational backgrounds, ethnic differences in labour market outcomes, such as sector selection, can emerge.

The rest of the chapter is structured as follows. The next section examines the institutional framework of labour markets with reference to the efficiency-equity trade-off embodied in the NEP. It enables us to look into why and how ethnic differential within sector selection emerges, accompanied by evidence on it from the existing literature. Section 5.3 develops empirical strategy around the analytical framework. The main focus is on the ethnic differential in sector selection, which has never been analysed comprehensively in the literature. Section 5.4 discusses the empirical results, and Section 5.5 concludes.

5.2 Historical and Institutional Backgrounds

The post-Independence period witnessed the rise of structural problems in labour markets, leading to inter-ethnic socio-economic disparity. The youth unemployment was evident in the 1960s, and it concentrated in urban rather than rural areas (Blarke 1975; Malaysia 1965, p. 79). Its incidence for Malays was high particularly among those having migrated from rural to urban areas (Lim 1973). And their socio-economic situation was not necessarily good since the majority still resided in the rural areas with fewer economic opportunities. Indeed, the average income growth of Malays relative to other ethnic groups was lower (see Jomo and Ishak 1986; Snodgrass 1980). This caused heightened political

action to improve the socio-economic conditions of Malays from the mid-1960s onwards.

The racial riots in 1969, which led to the declaration of an emergency, put to the fore the role of government in rectifying the socio-economic imbalances. It was believed that they were the root cause of the riots so that the NEP empowered the government to correct them (Bowie 1991; National Operations Council 1969). On the one hand, as analysed in the previous chapter, the government has intervened in various quarters of higher education to achieve its end. On the other hand, the government constructed labour markets to address the inter-ethnic concerns whilst continuing to satisfy growth imperatives. This efficiency-equity trade-off forms the basis of the institutional framework for labour markets in which various regulations and laws were constructed.

5.2.1 Public-Private Differentials in Labour Markets

According to human capital theory, the wage is the outcome of a perfectly working labour market. It corresponds with years of schooling and experience. It follows that higher education graduates of whatever ethnic origins would choose the sector and/or occupation with the same wage level. However, this is not the case in Malaysia's labour markets. Instead, it has been reported that the public sector, on average, offers a lower wage than the private sector (for example, Abdullah Sanusi, Mansor and Abdul Kuddus 2003; Osman-Rani and Salleh 1994; Salleh and Osman-Rani 1991).⁵⁸ For Lucas and Verry:

“In very broad terms, the real entry level wage in public service has followed a very clear ratchet, falling from 1976 to 1980, then falling again after the new peak. Taken over the twelve years from 1976 to 1988, there is no clear upward trend running through this ratchet. Thus, to the extent that public service competes with the private sector through entry level pay, the public sector should have become less attractive through time (Lucas and Verry 1999, p. 236).”

⁵⁸ Since no clear-cut data on public-private wage levels are available, I refer to previous studies. Also, I requested the Department of Statistics for releasing such census-related data, but was refused due to the sensitivity.

Public sector wage revisions were made twice in the 1970s and the government revised the wage schedule in 1980 (Jomo and Todd 1994; Salleh and Osman-Rani 1991). But it was not until the early 1990s that the public sector employees received increased remunerations in the form of the New Remuneration Scheme (NRS) announced in 1992 (Jomo and Todd 1994). The NRS was more favourable for the employees of higher grade (*ibid*), but it is still not as attractive as the private sector (Abdullah Sanusi, Mansor and Abdul Kuddus 2003).

On the other hand, the Bumiputera dominance in public sector employment is well documented by the same observers (Abdullah Sanusi, Mansor and Abdul Kuddus 2003; Lucas and Verry 1999; Salleh and Osman-Rani 1991). Table 5.1 shows that there is a clear ethnic differential in sector selection. Overall, higher education graduates were almost equally represented in the public and private sectors. However, Bumiputera graduates were more likely to choose the public sector with the lower wage, while non-Bumiputeras (Chinese and Indians, etc) the private sector. Indeed, 66.4 percent of the Bumiputera graduates were employed in the public sector, while the corresponding figures for Chinese and Indian graduates were 18.3 percent and 36.1 percent only. This ethnic differential in sector selection is also reported by Lucas and Verry (1999), who add that “growth of the public sector has been a very major vehicle for restructuring Bumiputera employment (Lucas and Verry 1999, p. 234).” Hence, even though they have completed the same level of education, different ethnic groups tend to choose different sectors.

Table 5.1 Distribution of Higher Education Graduates by Ethnicity and Sector of Employment (%),1982-3

	Public	Private	Total
Bumiputeras	66.4	33.6	100
Chinese	18.3	81.7	100
Indians and Others	36.1	63.9	100
Total	47.6	52.4	100

Source: Hamid-Don *et al* (1987), Table 3.2

Thus, it can be argued that wages are not the sole determining factor in selecting sector of employment. These facts also indicate that public and private sectors function differently, and that the labour markets do not work as the human capital theory assumes. Indeed, the capacity to explain the Bumiputera dominance in the public sector despite the lower wage requires a careful understanding of the institutional framework of Malaysia's labour markets. In this connection, the role of government in labour markets is to be understood appropriately. For inter-ethnic concerns and thus social stability, the government intentionally intervened in labour markets to secure employment for Bumiputeras. Under the win-win principle of the NEP, the public sector has been expanded primarily to employ them, and the private sector is expected to pump up economic growth. As seen below in detail, the equity-efficiency trade-off forms the basis of the institutional framework for Malaysia's labour markets.

Public-Private Differentials in Employment Practices

To understand how and why the ethnic differences in sector selection surfaced, it is useful to start with Article 153 of the Constitution prescribing the special rights of Bumiputeras in public sector employment. It touches on the association of both scholarship provision and employment (and recruitment) with ethnicity.

The government's scholarship policy, which automatically binds the holders to the public sector employment, is arranged in favour of Bumiputeras. Article 153 also provides for the special rights of Bumiputeras in scholarship provision. From the 1970s until the late 1990s, the government provided qualified students with scholarships for their undergraduate studies, which in turn required them to work in the public sector for a specific period (Abdullah Sanusi, Mansor and Abdul Kuddus 2003). Ethnic backgrounds rather than merit seemed to be stressed in the selection process. Mehmet and Hoong (1986) researched five local universities in early 1980s and found that almost 80 percent of the total scholarships went to Malays (see also Mehmet and Hoong 1985). It is also found that more than 80 percent of the recipients were employed in the public sector (Mehmet and Hoong 1986). Thus, the scholarship policy played a crucial role in both constructing labour markets for the purpose of inter-ethnic distribution and accelerating the Bumiputera (Malay) dominance in the public sector. These facts

point to the persistence of the ethnic factor from higher education through to labour markets, and demonstrate that the public sector in Malaysia does not work as human capital theory assumes.

Besides the scholarship provision, a large number of employment opportunities have been created in the public sector to absorb the increased number of graduates. The government created new job opportunities at the existing government offices, and also set up a considerable number of new public enterprises (Salleh and Osman-Rani 1991). In effect, the number of public enterprises jumped from 83 in 1969 to at least 736 in 1986 and then to 1189 in 1993 (Rugayah 1994, pp. 231 and 241). In particular, the largest increase in the growth of public sector employment was marked among Group A officers that correspond to managerial and professional posts and require higher educational qualifications (Abdullah Sanusi, Mansor and Abdul Kuddus 2003; Hai 2006; Osman Rani and Salleh 1994). The proportion of this group mounted from 4.6 percent in 1971 to a peak of 9.4 percent in 1985 before slightly declining to 9.2 percent in 1990 (computed by author from Osman Rani and Salleh 1994, Table 7.4; Salleh and Osman Rani 1991, Table 3.5).⁵⁹ Thus, higher education graduates were continuously absorbed as Group A officers until 1983, and the public sector even created new posts for them (Osman Rani and Salleh 1994).⁶⁰

The quantitative expansion of the employment opportunities matched well with the Constitution, and the recruitment process is generally in favour of Bumiputera candidates. According to Abdullah Sanusi, Mansor and Abdul Kuddus (2003), the interviews and discussion are conducted in Malays more than

⁵⁹ The figures for both 1971 and 1985, computed from Salleh and Osman-Rani (1991, Table 3.5) include federal posts only. On the other hand, the figure for 1990 includes federal and state level posts. However, as Salleh and Osman-Rani (1991) argues, the majority of posts created newly were at the federal level intended to absorb Bumiputera graduates. Thus, it is important here to interpret the general trend rather than the specific figures.

⁶⁰ Before the New Remuneration System (NRS) took effect in January 1992, the structure of the classification was as follows: Division I (or Group A) requiring university degree, Division II (or Group B) college diploma/ higher school certificate, Division III (Group C) school certificate, and Division IV (Group D) lower school certificate and below (Abdullah Sanusi, Mansor, and Abdul Kuddus 2003, p. 23).

English. Fluency in English, where Bumiputeras are generally believed to be handicapped, is not a major factor in the selection process.

Above all, ethnicity is of paramount importance in public sector employment. It is primarily for inter-ethnic equity purposes. Furthermore, the job security in the public sector is believed to play a role in accelerating the Bumiputera dominance (Abdullah Sanusi, Mansor and Abdul Kuddus 2003). For example, adjustments during the mid-1980s recession and the Asian financial crisis were done either by restricting new intakes or by reducing or freezing wage increases (Horton, Kanbur and Mazumdar 1991; Jomo and Hwok-Aun 2001; Osman-Rani and Salleh 1994). The option of cutting off existing staff was rarely chosen probably for equity concerns.

By complete contrast, the private sector is concerned with economic growth (efficiency) more than inter-ethnic equity. As envisaged in the NEP, this is for expanding the overall economic pie to distribute. Thus, ethnic considerations are, in general, of secondary importance in private sector employment.

This can be understood by reference to the institutional arrangements in the private sector. To pump up economic growth, the export-oriented moves became evident with the Investment Incentives Act 1968, the Free Trade Zone (FTZ) Act 1971 and the Licensed Manufacturing Warehouses (LMWs) Act 1971 (Jomo and Edwards 1993). In parallel, the Employment (Employment of Women) (Shift Workers) Regulations was introduced in 1970 to strengthen further Employment (Employment of Women) (female Conductors) Regulations 1958, which allows the night shift for female workers (Rasiah 1995b). This attracted foreign manufacturing firms, which were expected to bring employment and income effects locally.⁶¹ In line with the NEP, however, the Industrial Coordination Act (ICA) 1975 requiring an employment quota of 30 percent for Bumiputeras took effect in 1976.⁶² But it was frequently revised by the mid-1980s due to mounting oppositions from the non-Malay local business community, which had repeatedly

⁶¹ The employment effect of exports is quantitatively confirmed by Wah (1997).

⁶² A legal expert, Yasuda (1991), points out that the ICA aims to regulate manufacturing activities in Malaysia but nowhere is the objective of the NEP declared in the Act.

complained of its negative effect on their economic activities (Bowie 1991; Yasuda 1991).⁶³

The export promotion strategies played an important role in bringing the Malay female labour force from the rural sectors (Ariffin 1992, 1994). Though having some implications for the goal of restructuring society, it was primarily for constraining labour costs and seeking economic growth through export activities. The pursuit of economic growth accelerated in the 1980s with the Industrial Master Plan in 1985 and the Investment Promotion Act (IPA) 1988 (see for example, Jomo 1989; Rasiah 1995b). After the late 1980s, therefore, less emphasis was placed on ethnic considerations in the private sector.

With regard to employment practices, private sector employers can institutionally resort to retrenchment, re-contracting and temporary shutdowns (Salih and Young 1989 quoted in Kuruvilla and Arudsothy 1995). This contrasts with the public sector. For example, Lucas and Verry (1999) looked into the retrenchment during the mid-1980s recessions, and found that private sector employees were more likely to be retrenched than public sector counterparts.⁶⁴ Since the mid-1980s, Malaysian manufacturing witnessed “a shift away from employment security and a shift of employment risk away from companies to workers (Standing 1993, p. 43).”

Something similar happened during the Asian financial crisis. When it hit the economy, the government advised the private companies to adjust employment by temporary layoff, voluntary separation scheme and pay cuts in order to curtail adverse employment and income effects. The Employment Act 1955 was amended, and the guidelines encouraging pay offs, working hour reductions and part-time employment were implemented (Jomo and Hwok-Aun 2001). Nonetheless, severe employment downturns were recorded in the private sector,

⁶³ Its effects on foreign capital were not substantial partly because the government reassured that export processing foreign firms could be exempted from the ICA (see Bowie 1991, pp. 100-8; Rasiah 1995a).

⁶⁴ See also Mazumdar (1993), who investigates wage rigidity in the mid-1980s with reference to institutional factors such as contractual length (normally more than two years) and seniority-based wage-setting practice. These arguments already indicate that Malaysian labour markets do not function as a perfect market.

such as manufacturing and services sectors (*ibid*). As Bank Negara Malaysia (1998, p. 96) reports, the private sector employment cut-off was affected by demand contractions, which reflects its efficiency concerns.

In general, the public-private differentials in employment practices reflect the trade-off between equity and efficiency, which develops around ethnicity. The public sector with equity (and thus ethnic) concerns sharply contrasts the private sector with efficiency (and thus growth) concerns. Both are complementary in maintaining the social stability, but this trade-off has significant implications on labour markets. Unsurprisingly, then, it forms the basis of the institutional framework in which the ethnic differences in sector selection emerge.

Public-Private Differentials in Fringe Benefits

The arguments so far indicate that the equity-efficiency trade-off gives rise to the public-private differentials in employment practices, thereby constituting the institutional framework of labour markets. As seen below, the public-private differentials in fringe benefits further intensify the arguments, by intertwining with those in employment practices. In fact, the wage level of the public sector is lower but it offers more favourable benefits in terms of “the non-contributory pension scheme, low-interest rate loans for housing, conveyance and computer and the opportunities for specialist training or post-graduate studies (Abdullah Sanusi, Mansor and Abdul Kuddus 2003, p. 87).” This is for equity concerns that are imperative for maintaining social stability, and besides the employment practices, can induce Bumiputera graduates to work in this sector.⁶⁵

To avoid misunderstanding, some reference is made back to the human capital theory before proceeding (see also Chapter 3). In the light of the findings and arguments that follow, those who are wedded to it would make modifications to the left-hand side of the Mincerian function in order to explain Bumiputera dominance in public sector employment: wages are augmented by fringe benefits

⁶⁵ According to an opinion survey of government officers conducted in 1999, fringe benefits can compensate for the lower wage (Abdullah Sanusi, Mansor and Abdul Kuddus 2003, pp. 97-8).

to better reflect the earnings of individuals since the public sector offers the lower wage level but more favourable sets of those benefits. However, my argument that the human capital theory contributes little to an understanding of the functioning and structures of Malaysia's labour markets remains unchanged. The proponents bring in the fringe benefits that do not necessarily reflect the marginal productivity of workers, contradicting the initial assumption of the perfect labour market. Differently functioning labour markets, namely the public and private sectors in this case, are brought into the model that assumes identically working labour markets. This highlights the deviation from the underlying theory. Further, the way in which modifications are made conceals rather than reveals why and how the public sector offers favourable sets of fringe benefits. Above all, the following arguments are not made to develop remedies to the human capital theory but to reinforce the political economy approach taken so far.

Having said so, the differentials in training, social security and pension are in turn discussed in what follows. This helps us to deepen the historical and institutional context in which the ethnic differentials in employment patterns emerge.

Training

The first differential is in training. In the case of the public sector, the successful candidates, before being formally appointed, go through free training programmes at the National Public Administration Institute (Institut Tadbiran Awam Negara, INTAN) (Abdullah Sanusi, Mansor and Abdul Kuddus 2003). And after starting to work, the option of further study is available:

“The training award is normally on full-pay study leave which entitles the holder to a training allowance, tuition fees, passage (if overseas) for student and family as well as the monthly salary. During the study leave, promotion prospects will not be jeopardised (Abdullah Sanusi, Mansor and Abdul Kuddus 2003, p. 89).”

This sharply contrasts with the private sector, which usually does not have an institutionalized training programme. From the employees' perspective, it is up to the employers whether to provide training and what types of training despite some government efforts. For example, the government established the Human Resource Development Fund (HRDF) in 1992, to which firms contribute one percent of the employees wages monthly (Malaysia 1996, pp. 119).⁶⁶ Upon application by private firms, the HRDF reimburses for training courses approved by Human Resources Development Council (HRDC). However, Malaysia (1996, p. 120) points to "employers preferences for in-plant training over training offered by external training providers" such as those by HRDC, and also finds that some sectors and small firms do not even utilize the fund or claim the reimbursement due to the nature of their production methods. In effect, the participation rates of the total workers in the manufacturing and services sectors were extremely low: 7.2 percent in 1998 and 4.3 percent in 1999 (Ragayah, Hwok-Aun, and Abdul-Rahman 2002, p. 146).

*Social Security*⁶⁷

The second differential lies in social security. The Social Security Organization (SOCSO) was established in 1971 to administer the Employees' Social Security Act 1969 and the Employees' Social Security (General) Regulations 1971. The SOCSO offers two schemes: the Employment Injury Insurance Scheme and the Invalidity Pension Scheme. The former offers "protection for industrial accidents, occupational diseases and commuting accidents", and the latter provides "a 24-hour coverage in the event of invalidity or death resulting from whatever cause (Ministry of Human Resources Malaysia 2008, p. 77)."

⁶⁶ Originally it covered manufacturing firms with 50 or more employees, but it was revised later to include those with 10 to 49 employees and also firms in service sectors such as "hotel industry, air transport, tour operating business and travel agency business, telecommunications, freight forwarders, shipping, postal and courier services, advertising and computer services (Malaysia 1996, p. 119)."

⁶⁷ Unless specified, this paragraph builds on Ministry of Human Resources Malaysia (2008) as well as Ragayah, Hwok-Aun and Abdul-Rahman (2002), who comprehensively compile information on Malaysia's social security system through annual reports and government publications.

The Employment Injury Insurance Scheme is based on monthly contributions by both employers and employees. The benefits under the Invalidity Pension Scheme are paid out with reference to the level of earnings. Significantly, the coverage of the schemes does not cover social insurance or assistance and is confined to “provision of injury and incapacitation benefits (Ragayah, Hwok-Aun, and Abdul-Rahman 2002, p. 130).” Furthermore, when the abuse of the scheme became evident in the 1990s, the government replaced the Act with the Occupational Health Safety Act 1994. Consequently, more discretion and responsibility have shifted to employers.

This contrasts with the public sector. As mentioned earlier, jobs in the sector are assured even during a recession, which can offset the absence of an institutionalized social insurance and assistance. And the benefits offered are non-contributory. For example, it provides the employees and also their family members (parents, spouses and children) with all the medical allowances if they are treated in public hospitals (Japan Institute of Personnel Administration 1997). And as examined below, the differentials in pension provision also highlight the difference between the public and private sectors.

Pension after retirement

The third differential is in pension after retirement. While the Employees Provident Fund (EPF) requiring contributions of the employees is the only option for private sector employees, the public sector employees have an additional choice of the pension scheme introduced by the Government Pension Ordinance 1951 (Abdullah Sanusi, Mansor and Abdul Kuddus 2003).⁶⁸ Such advantage in choice is also compounded by the content of the pension scheme. In contrast to EPF, it is non-contributory and financed by tax revenues (Ragayah, Hwok-Aun,

⁶⁸ According to the Articles 40-43 of the Employees Provident Fund Act 1991, all employers registered under the Companies Act 1965 are legally required to register their employees with the EPF, and both the employers and the employees jointly make monthly contributions on the basis of wages (see Act 452). The contribution rate of the employee's salary has been shared by them: 10 percent between 1952-1974 (5 percent from each); 13 percent between 1975 and 1979 (7 percent from employers and 6 percent from employees); 20 percent between 1980 and 1992 (11 percent from employers and 9 percent from employees); 22 percent between 1993 and 1995 (12 percent from employers and 10 percent from employees); and 23 percent since 1996 onwards (12 percent from employers and 11 percent from employees) (Thillainathan 2003, Table 2).

and Abdul-Rahman 2002). The pension scheme was revised in 1976, which made itself more attractive from the employees' perspective. Specifically, the Special Cabinet Committee on Public Sector Salary headed by the then Deputy Prime Minister, Mahathir Mohamad, demanded: "the extension of the pension scheme to the beneficiaries of the retiree after his death; to his widow for life, and to his children until the age of eighteen years, or twenty-one, in case of college-going children (Abdullah Sanusi, Mansor and Abdul Kuddus 2003, p. 229)." Unsurprisingly, "such 'beyond the grave' pension scheme to an employee is not only unavailable in the Malaysian private sector but in public sector of other countries as well (*ibid*)." In 1980, the scheme was formally amended by the Pensions Act 1980, which further provides "income protection for all employees in the public sector (Ragayah, Hwok-Aun, and Abdul-Rahman 2002, p. 134)." The benefits that it carries are widespread, including "those relevant to employment injury, disability, superannuation or gratuity payment upon retirement and dependents' pension in the event of death while in service and death after retirement (*ibid*)." Needless to say, these benefits are not available in the private sector.

Public-Private Differentials in Trade Union Activities

There are also public-private differentials in trade union activities, although they are not as vast as the differentials in employment practices and fringe benefits. In fact, trade union activities are controlled in both sectors. Nevertheless, it is meaningful to look at them since they also reflect the equity-efficiency trade-off in Malaysia.

Historically speaking, trade union activities have been marginalized politically around the Trade Union Ordinance (TUO) 1959 and the Industrial Relations Act (IRA) 1967 (Arudsothy 1990).⁶⁹ On the one hand, the TUO 1959 empowers the Registrar of Trade Unions, or presently the Director General of Trade Unions,

⁶⁹ The British colonial government established the Malayan Trade Union Council in 1950 dominated by Indians (later the Malaysian Trade Union Congress since 1963, or MTUC), in order to emasculate the economic and political challenges posed by unions associated with Chinese Communist Party (Rowley and Bhopal 2006). The ethnically concentrated membership "not only undermined the horizontal (class) organising principles of trade unionism, but also had the potential to bring the new labour movement into conflict with its potential future membership (*ibid*, p. 101)".

with strong and wide-ranging decisions regarding the registration of unions (Syed Ahmad 2002). Hence, unionisation itself was tightly restricted by the government. On the other hand, trade union federations are registered as societies under Societies Act 1966 rather than as unions under Trade Unions Act 1968 so that they are institutionally prohibited from even holding pickets (Jomo and Todd 1994).

The NEP further accelerated this trend. In particular, the ethnic focus of the NEP “attributed trade-union issues of distribution as secondary, if not detrimental, to the development process (Rowley and Bhopal 2006, p. 102).” Hence, the government has reinforced its grips over the unionisation of workers so that firms can keep labour costs down for economic development (Kuruvilla 1996; Kuruvilla and Arudsothy 1995; Kuruvilla and Venkataratnam 1996).⁷⁰ At a broader level, however, behind these government strategies there was “the need for the retention of state legitimacy or political support in a political structure dominated by an ethnic discourse, which itself is constructed as fundamental to the construction of legitimacy (Rowley and Bhopal 2006, p. 108).” Therefore, the government policies on unions are the reflection of the underlying principle of the NEP so that ethnic considerations in this sphere are important in connection to the equity-efficiency trade-off.

In the public sector, the umbrella body, namely the Congress of Union of Employees in the Public and Civil Service (CUEPACS) established as a trade union in 1957, was disaffiliated in 1980 from MTUC, which in turn acknowledged the former as “a national trade union centre representing employees in the public sector (Jomo and Todd 1994, p. 157).” This successfully reduced the bargaining powers of CUEPACS and MTUC, and entrenched the government control over unions (Jomo and Todd 1994; Osman Rani and Salleh 1994). Nonetheless, the public sector employees can have the various benefits mentioned earlier, which can offset their weakened position, while the private sector counterparts do not. This indicates the crucial public-private difference deemed to come from the government’s ethnic concerns.

⁷⁰ For a broader literature on East Asian economic growth trajectories, see Deyo (1989).

By complete contrast, the pursuit of economic growth was brought to the fore in the case of the private sector. For example, it is well documented that unionisation was banned in the foreign-dominated export-oriented electronics industry until 1988 for cost containment purposes (Bhopal and Rowley 2002; Rasiah 1995b). The Look East Policy announced in 1983 emphasised work ethic without such incentives as lifetime employment and seniority systems (Jomo 1989). Given international human rights pressures including from the US Congress, the government accepted in-house unions in electronic industries (for details, see Jomo and Todd 1994, pp. 153-6), but they never changed the stance favouring economic growth *vis-a-vis* labour interests. In the face of MTUC's opposition to the in-house unions, the government further marginalised MTUC by setting up the government-backed Malaysian Labour Organization (MLO) in 1988 to segregate the labour movement (Rowley and Bhopal 2006). And in the 1990s, the government advised the MLO to dissolve itself and join the MTUC so that internal divisions were intentionally created within MTUC to weaken its bargaining position (Bhopal 2002; Bhopal and Rowley 2002). As such, the government consistently and deliberately attempted to marginalize trade union activities in the private sector. Although there is a sign of involving unions in policy-making scene after the Asian financial crisis, its real effects remain unknown and this government attitude has been open to doubt in terms of sustainability (see Peetz and Todd 2000). The focus is still on economic growth and efficiency (for details, see Frenkel and Kuruvilla 2002; Peetz and Todd 2000).

In parallel, the structures and activities of unions, even once registered, are tightly controlled by the government (Jomo and Todd 1994). The Essential (Industrial Relations) Regulations 1969 and the Essential (Trade Unions) Regulations 1969 were passed so that the government would be able to "segregate the unionisation of different classes of workers and workers from different trades, occupations and industries (Syed Ahmad 2002, p. 64)." As a consequence, the union density was estimated at less than 10 percent in 1990 (Jomo and Todd 1994). The number of unions declined from 250 in 1957 to 241 in 1971 and then increased to 301 in 1988 (Jomo and Todd 1994, Table 2.1).

Furthermore, on the industrial relations front, there is little room for either strikes or industrial disputes (Jomo and Todd 1994; Kuruvilla and Erickson 2002). Much discretion pertaining to industrial relations institutionally resides with the Minister of Human Resources (which was named as Minister of Labour until July 1990), whilst the Industrial Relations Act 1968 strictly prohibits types of matters to bargain (Jomo and Todd 1994).

When looking at these historical trends together with public-private differentials in employment practices and fringe benefits, the role of the equity-efficiency trade-off in labour markets is evident. The public sector, though its wage level is lower, is full with a number of non-wage benefits, which to some extent offset the weakened bargaining position of CUEPACS. On the other hand, trade union activities in the private sector have been consistently sacrificed in pursuit of economic growth, which is considered important for social stability.

5.2.2 Ethnic Differentials in Sector Selection: Previous Findings

This part looks at previous findings on trends in public and private sector employment. From the discussion so far, it will be presumed that Bumiputeras, or Malays, are dominant in public sector employment but non-Bumiputeras, namely Chinese and Indians, are well represented in private sector employment.

As seen shortly, there are a number of studies that looked into the association between ethnicity and public sector employment. However, there is no study that investigated ethnicity and sector selection, conditional on educational backgrounds. Nonetheless, it is meaningful to start from the previous findings in order to set up empirical hypotheses that are consistent with the political-economic arguments and to highlight the contributions this chapter delivers. First, we look at trends of total employment, followed by public and private sector employment.

Trends of Total Employment

Table 5.2 uses *Economic Report* published annually by the Ministry of Finance, and roughly shows the trend of the public-private distribution of total employment from 1970 until 2000. Before proceeding, it must be emphasised

that 'the public sector' in this table represents 'public administration' only and it excludes other public sector jobs, such as teachers and medical officers. Thus, it is necessary to interpret the table with some reservation.

With these caveats in mind, two points can be found. First, it can be argued that the absorptive capacity of the public sector appears limited. Its share fluctuated between 10 and 15 percent, and it has declined from the mid-1980s onwards. Second, when it comes to the private sector, the share of agriculture has continuously declined over the three decades, but the shares of the manufacturing and service sectors have increased. This is as is documented in the literature on the structural changes the economy went through (Hill 2005; Jomo 1990; Salleh and Meyanathan 1993; Zainudin Salleh and Osman 1982).

In light of the purpose of this chapter, however, this table is not sufficient. This is because it does not disclose the ethnic association with sector. In effect, the public sector is a large employer of Malays, which can be discerned by Table 5.3.⁷¹ In 1990, the Bumiputera share of public sector employment was 14.6 percent, which is greater than the Chinese and Indian shares of 9.8 percent and 12.3 percent, respectively. When compared with Table 5.2, it can be argued that Bumiputeras were well represented in the public sector and non-Bumiputeras in the private sector. In tandem with Table 5.1, this corresponds well with the expected findings mentioned earlier.

⁷¹ Before Malaysia (1991), no Malaysia Plan treats this explicitly. Malaysia (1996, Table 3-2) and Malaysia (2001, Table 3-7) describe employment by sector and ethnicity, but both unfortunately add up public service together with private and community services. Thus, they overstate the ethnic differential in sector selection so that I ignore them in constructing Table 5.3.

Table 5.2 Public-Private Distribution of Total Employment (in percentile), 1970-2000

	1970	1975	1980	1985	1990	1995	2000
Public Sector	11.9	12.9	13.3	14.6	12.7	10.9	10.6
Private Sector	88.1	87.1	86.7	85.4	87.3	89.1	89.4
Agriculture	53.2	47.6	39.5	31.3	28.3	18.7	15.2
Manufacturing	9.0	11.1	15.6	15.2	19.9	25.3	27.6
Services	20.6	22.1	23.6	30.5	34.5	35.7	38.1
Others	5.3	6.3	8.0	8.4	4.6	9.4	8.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Major sectors of the private sector were chosen to be consistent with the tables to follow later. Services include transport, trade and finance sectors, and Others contain all the other private sector industries.

Source: Ministry of Finance, *Economic Report*, various issues.

Table 5.3 The Ethnic Differential in Sector Selection in 1990 (in percentile)

	Public Sector	Private Sector					Total
		Subtotal	Agriculture	Manufacturing	Services	Others	
Bumiputera	14.6	85.4	36.7	17.0	19.0	12.7	100.0
Chinese	9.8	90.2	13.5	21.8	39.9	15.0	100.0
Indians	12.3	87.7	21.8	28.0	25.8	12.1	100.0

Note: See Note for Table 4.2.

Source: Computed by author using Malaysia (1991, Table 1-11).

Public Sector Employment

As mentioned earlier, the NEP period saw the persistence of the Bumiputera (or Malay) dominance in public service. In 1990, for example, the Bumiputera proportion of the public sector employment was 65.9 percent, which exceeded the proportion of the total employed, 57.8 percent (Malaysia 1991, Table 1-11). Such ethnic association with public service remained unchanged even after the NDP was introduced in 1991. To capture this, it is useful to refer to Abdullah Sanusi, Mansor and Abdul Kuddus (2003) since two of the authors are former senior civil servants and have privileged access to unpublished evidence. Unfortunately, however, evidence on educational profiles of civil servants in the

1980s is not provided elsewhere, including Lucas and Verry (1999) who had rather privileged access to unpublished data sources.⁷²

Table 5.4 breaks down public service by type of occupation with reference to ethnicity. First, it must be stated that public administration alone does not make up public sector employment (recall the argument on Table 5.2). Next, the table clearly points to the Malay dominance in public service. They amounted to 68.7 percent of the total civil servants, which is greater than its proportion of the total employed as of 2000, 51.5 percent (Malaysia 2001, Table 3-7). In particular, their dominance is obvious among 'Pegawai Tadbir dan Diplomatik' (PTD, or Diplomatic and Administrative Officers) who serve at federal ministries and state-level governments and engage in policy formulation and implementation. They accounted for 87 percent of its total. By contrast, when it comes to medical officers, the Malay dominance is far less evident and Chinese and Indians together accounted for 46 percent of the total. Yet, the general trend is that, over time, fewer Chinese and Indians prefer the public sector to the private sector (Abdullah Sanusi, Mansor and Abdul Kuddus 2003). This suggests that the Malay dominance has accelerated throughout the 1990s.

In light of the importance of PTD in national policy-making, it seems meaningful to examine it a little further. Table 5.5 shows the ethnic and gender distribution of candidates for PTD in public service in 1995. Unsurprisingly, the table indicates that the majority of applicants were Malays and men were well represented, and also that Malay men accounted for more than half of the applicants called for test and interview. According to Abdullah Sanusi, Mansor and Abdul Kuddus (2003), many applicants were from the developed states such as Selangor and Kuala Lumpur and also from the Malay-dominated states such as Kedah, Kelantan and Trengganu. These facts clearly indicate that even at the time of application the Malay dominance is apparent.

⁷² Lucas and Verry (1999) stated that it was impossible to obtain the evidence for the 1980s.

Table 5.4 Managerial and Professional Officers by Type of Service and Ethnicity, 1999

	Malays	Chinese	Indians	Total
PTD	86.8	7.1	6.1	100
Accountants	81.5	15.6	2.9	100
Medical	53.7	22.1	24.2	100
Engineers	73.9	23.9	2.2	100
Legal	87.3	7.3	5.4	100
Total	68.7	17.5	13.8	100

Note: Figures in parenthesis are the proportions of the total (in percentile).

Source: Computed from Abdullah Sanusi, Mansor and Abdul Kuddus (2003, Table 4.1)

Table 5.5 Distribution of Candidates for PTD by Ethnicity and Sex (in %), 1995

	Malay		Chinese		Indians		Total
	Male	Female	Male	Female	Male	Female	
CT	54.8	37.4	1.1	0.9	3.6	2.2	100
CW	55.4	36.1	1.4	1.0	3.8	2.3	100

Note: CT denotes "called for written test", and CW "called for interview".

Source: Adapted and Computed from Abdullah Sanusi, Mansor and Abdul Kuddus (2003, Table 4.2)

Private Sector Employment

Reflecting the fact that the public sector employment is dominated by Malays, it can be easily surmised that non-Bumiputeras, namely Chinese and Indians, are well represented in private sector employment. This is shown in Table 5.6, adapted from Lucas and Verry (1999) who had privileged access to Economic Planning Unit (EPU) of the Prime Minister's Department. Before looking into this, however, it must be stated that they did not seem to obtain evidence on the ethnic association with educational background in addition to the ethnic differential in sector selection as well as figures on agriculture.

Two interesting findings are found from Table 5.6. First, the highly educated do not necessarily opt for employment in manufacturing, transport and trade sectors. Indeed, those with secondary educational backgrounds were better represented in these sectors. By contrast, those with higher education were well represented in finance sector employment. In 1987, around 16 percent of the employees in the sector have attained higher education, which is greater than

their total proportion of the whole workforce, 5.1 percent. Second, except in the transport sector, Malays were under-represented in private sector employment. It can be stated that they opted for the public sector or agricultural employment. In contrast, Chinese were well represented in manufacturing, trade and finance sectors. In particular, their presence in the latter two sectors is evident. But, for the case of Indians, no confirmed references can be made due to data unavailability.

Similar evidence on the 1990s is not available. For example, the annually published *Labour Force Survey Report* does not provide the total number of the employed by each ethnic group. Neither does it supply similar information on educational backgrounds. All this makes it difficult to compute and derive a similar table with Table 5.6.

Table 5.6 Private Sector Employment by Educational Background and Ethnicity (in percentile), 1980 and 1987

	Manu- facturing		Transport		Services Trade		Finance		Malaysia Total	
	1980	1987	1980	1987	1980	1987	1980	1987	1980	1987
Education										
None/unknown	8.0	6.5	7.0	4.4	12.2	8.9	5.6	0.9	8.8	12.6
Primary	42.2	34.7	46.4	38.3	43.5	35.5	20.6	12.6	43.6	37.3
Lower	27.3	30.6	22.4	26.0	24.8	27.5	17.9	12.7	18.0	22.1
Secondary										
Upper Secondary	18.9	23.4	21.2	26.5	16.9	23.9	38.3	47.0	14.6	20.3
Post Secondary	1.5	2.2	1.1	2.6	1.5	2.5	7.8	11.0	0.4	2.6
Tertiary	2.1	2.6	2.1	2.1	1.1	1.7	9.8	15.8	3.6	5.1
	100	100	100	100	100	100	100	100	100	100
Ethnicity										
Malay	37.8	41.4	48.3	46.0	32.7	32.2	41.4	37.3	47.8	44.9
Chinese	50.1	41.4	35.0	34.0	56.9	55.1	38.8	46.2	33.5	33.1
Other*	12.1	17.2	16.7	20.0	10.4	12.7	19.8	16.5	18.7	22.0
	100	100	100	100	100	100	100	100	100	100

Note: Transport (transport, storage and communications), Trade (wholesale and retail trade, and hotels and restaurants), and Finance (banks and financial houses, insurance, real estate and property management, business services such as brokers, consultants and accountants, and other financial services); Other* includes Indians since according to Lucas and Verry (1999) no separate data was available from the EPU.

Source: Adapted from Lucas and Verry (1999, Table 6.2 and Table 7.1)

Ethnicity and Sector Selection

As expected from the discussion in section 5.2.1, previous findings suggest that Bumiputera, or Malays, were over-represented in public sector employment, and that the public sector is a large employer of higher education graduates. These two different findings are significant on their own, but they would be more so if we investigate all this comprehensively. However, there is no study analysing the association between ethnicity and sector selection, conditional upon higher education achievement. This is unfortunate since, presumably, the lack of such study has made it difficult to consider the labour market implications on graduate unemployment that is concentrated amongst Malays (recall Chapter 1).

This is where this chapter has something new to offer. First, it aims to investigate to what extent ethnic differences in sector selection exist despite the same higher educational backgrounds, through the following hypothesis:

Hypothesis 1: Malays are more likely to go into the public sector than Chinese and Indians, conditional on higher education achievement and gender.

This hypothesis refers to between-group differences in sector selection, and allows us to test if Malay graduates are most likely to go into the public sector.

Second, this chapter also aims to investigate within-group differences in sector selection which have also been never analysed in the literature. To set up a hypothesis on this, however, two points deserve attention. First, Chapter 4 found the changing pattern of women's higher education enrolment. In particular, women outstripped men in terms of the probability of higher education participation over the 1990s (see Table 4.8). Second, despite the lack of quantitative evidence, it has been noted that men constitute the majority group of public sector employees (Ariffin 1992, 1994; Khasnor 1984). Unfortunately, however, there are no studies that have investigated gender differences in public sector employment together with those in higher education enrolment. In this regard, we will examine these within-group differences through the following hypothesis:

Hypothesis 2: Men are more likely to go into the public sector than women, conditional on higher education achievement and ethnicity.

As will be discussed in section 5.3.2, we must be cautious when testing these hypotheses. The prime reason for this is that there are issues of participation in the labour force and wage employment (i.e., public or private sector employment). Econometrically speaking, both are not necessarily alternative choices to each other. This means that the observed sample of the wage employed, like the ones for Tables 5.2, 5.3 and 5.5, is not necessarily random since some individuals are already screened when choosing not to be wage-employed. When testing the conditional hypotheses such as these, therefore, it is necessary to set up an empirical strategy to control for this sample selection problem (I shall look at this in section 5.3.2).

Above all, by testing the two hypotheses, it becomes possible to complement the previous chapter and examine the relationship between higher education achievement and sector selection in labour markets. In parallel, the rest of this chapter presents some basic information on general features of Malaysia's labour markets, let alone the (ethnic) profiles of public sector employment.

5.3 Empirical Strategy

5.3.1 Data

The rest of this chapter is developed by analysing the two percent random sample of the *Population and Housing Census Malaysia 2000*, and seeks to test the two hypotheses. Similar to Chapter 4, the individual sample is used since our focus is on individual characteristics and labour market structures.

As far as labour markets are concerned, the present data set has two merits. First, it contains information on both education backgrounds and labour market status, like labour force participation (LFP) and employment. This enables us to analyze the roles of ethnicity and education in labour markets. Second, it contains information on sector of employment, namely public or private sectors,

which is not available in other government publications, including all the previous censuses. This allows us to investigate ethnicity and sector selection by controlling for educational backgrounds. Obviously, this data set has some limits. It does not include household-level information such as land ownership and income. Also, it is a cross-section data so that it is impossible to track the trend of labour market features. Nonetheless, the rich coverage is extremely useful in examining features of labour markets in Malaysia.

Similar to the previous chapter, I focus on the three major ethnic groups of Malaysian citizens born in Malaysia but, in this chapter, only those aged between 25 and 49 years old are considered. Those above 25 years old of age are assumed to have completed formal education. For example, the Ministry of Education (2000) defines 24 years old as the upper bound age of the school-going cohort. Similar to Chapter 4, the upper bound is set for 49 years, since 50 years is generally the retirement age of women in Malaysia. The sample size is thus reduced to 113,249, and the ethnic distribution is 58.6 percent for Malays, 32.1 percent for Chinese and 9.4 percent for Indians (see Table 5.7).

Table 5.7 The Sample Distribution by Ethnicity

	Frequency	Percent
Malays	66,313	58.6
Chinese	36,314	32.1
Indians	10,622	9.4
TOTAL	113,249	100.0

5.3.2 Estimation Strategy

There are a number of studies on public-private employment selection in other countries (for example, Assaad 1997; Christofides and Panos 2002; Tansel 2005; Terrell 1993). When it comes to the literature on Malaysia, however, there is no study that investigated public-private employment choice. It is for this reason that it is necessary to reconcile the purpose of this empirical study with the nature of the present data sets. In this connection, some discussion of the previous studies on similar topics is useful in order to identify the best possible strategy.

Previously, a few studies have investigated LFP (Chesher 1989 cited in Lucas and Verry 1999; Milanovic 2005) or self-employment choice (Deremy and Chesher 1993). However, the main aim of these previous studies was *not* to lay bare the peculiarities of Malaysia's labour markets like this study, but to use the selection equation as the first-stage condition for estimating Mincerian equations. This is based on Heckman type estimation method to control for sample selection bias in estimating Mincerian equations (Heckman 1974, 1979).

Although their empirical motives are different to mine, their empirical strategies can set the starting-point from which to determine our empirical technique. Generally speaking, they used two techniques that can be candidates for our study. On the one hand, a probit technique was employed by Deremy and Chesher (1993) and Milanovic (2005). For example, Milanovic (2005) generated the binary choice LFP equation, and estimated it with a probit technique.⁷³ Deremy and Chesher (1993) estimated a binary choice equation between self and paid employment with a probit technique.⁷⁴ In both studies, a single-step decision of binary rather than multiple choices is assumed.

On the other hand, Chesher (1989, cited in Lucas and Verry 1999) considered a single-step decision of multiple choices by using a multinomial logit (MNL) model estimating the probability of choosing one of the three alternatives: waged employment, unpaid family work and non-LFP. Thus, the MNL models can be another candidate.

However, the problems with MNL models are well documented in the literature (see Greene 2003; Long 1997; Long and Freese 2006). In particular, the Independence from Irrelevant Alternatives (IIA) assumption, which means that the odds ratio concerned is independent of the remaining outcomes or that adding or deleting any one of the alternatives does not change the odds among the other

⁷³ It was part of the World Bank's "Inequality around the World" project.

⁷⁴ One major difference between Milanovic (2005) and Deremy and Chesher (1993) is that the former sums up income from paid employment with self employment whereas the latter does not. This reflects that Milanovic (2005) does not focus on the difference between them while Deremy and Chesher (1993) do.

alternatives, is frequently violated since various factors influence the decisions on LFP and employment choice *differently*. To overcome this problem, attempts have been made by developing mixed logit models that can relax the IIA assumption by dividing the multiple choices into a hierarchy of decision levels (see Hensher and Greene 2001; Greene 2003). Yet, this in turn requires alternative-specific data that “have as many values for a variable as there are alternatives (Long and Freese 2006, p. 293).” Unfortunately, the generating process of the present data does not allow us to use mixed logit models. Our data set is case-specific data, which, irrespective of alternatives, includes only one value for each variable. This is inconsistent with the point that mixed logit models require alternative-specific data.

Above all, choice is to be made between a probit technique and MNL models. Before proceeding and selecting the best possible strategy, some notes deserve mention at this point. To apply the Mincerian approach, to remedy analytical deficiencies of human capital theory or to derive a ‘best-fitted’ econometric model is *not* the purpose of this study. Rather, the primary focus is to see what emerges out of the present data set in relation to the political-economic arguments developed earlier. Hence, this empirical study is illustrative, and compromise is made between testing the hypotheses developed in section 5.3.2 and the nature of our data sets.

With these points in mind, it can be argued that the MNL model is not appropriate for our study due to two reasons. The first reason is empirical. As mentioned, the IIA assumption essentially requires that the choices be substitutes to each other. Yet, it is well-known that different factors are at work when determining labour force participation and sector of employment, so that these choices can not necessarily be treated as alternatives. I tested the empirical relevance of the MNL model using Hausman tests and Small-Hsiao tests of IIA assumption (see Long and Freese 2006, pp. 243-6 for details of these tests). But it failed to pass the two tests, suggesting that the decisions on wage employment participation and sector selection are not alternatives and that the MNL model is

inappropriate for this case (see Appendix A).⁷⁵ Indeed, it will be seen later in section 5.4 that various ethnic groups demonstrate different patterns of labour force participation and wage employment selection, supporting these arguments.

Besides this, there is another reason that further undermines the relevance of using the MNL model. If we still stick to the MNL model despite the empirical problem explained above, then we need to cut-off the raw data to create a sub-sample that best fits its statistical requirement to pass Hausman and Small-Hsiao tests of IIA assumption. Needless to say, this econometric-driven approach causes some substantive problems. First, it requires us to sacrifice some data that would help us to depict important aspects of labour markets. Obviously, it does not coincide with the main purpose of this empirical research, which is to illustrate reality from the data sets. Second, by cutting some data, we would have to ignore the issues of participation in the labour force and wage employment, which is related to sector selection and thus contains some important information on Malaysia's labour markets. Further, the sub-sample to be constructed for using the MNL model would not necessarily be a random sample of the entire population (section 5.4.1 also looks at this). The empirical strategy chosen by Milanovic (2005), who used a probit technique rather than the MNL models, indicates the severity of this problem. Above all, the MNL models do not necessarily match the nature of Malaysia's labour market analysis.

By contrast, a probit technique has some merits for the present study. Without cutting some data, it can be extended to incorporate the two-step decisions to be in wage employment and to choose between public and private sector employment. Unlike the MNL models, therefore, this enables us to have two decisions that are different by nature but can be made simultaneously, whilst keeping the richness of the present data. Against this background, I consider the following sector selection with reference to Assaad (1997) and Christofides and Psahardes (2002):

⁷⁵ None of the Hausman tests rejected the null hypothesis that the IIA holds, but all the Small-Hsiao tests did reject it.

$$D_1 \begin{cases} 1 = \text{engage in wage employment, if } Y_1^* > 0 \\ 0 = \text{not, otherwise} \end{cases}$$

$$D_2 \begin{cases} 1 = \text{work in the public sector, if } Y_2^* > 0 \\ 0 = \text{work in the private sector, otherwise} \end{cases}$$

where Y_1^* and Y_2^* are unobserved latent variables pertaining to the difference in individual decisions in wage employment and between public and private sector employment. Non-participation in wage employment, or choosing zero in the first decision (D_1), includes self-employment as well as non-participation in labour force and unemployment. Specifically, the latent variables can be written in the following linear form:

$$\begin{aligned} Y_1^* &= \alpha_1 X_1 + \varepsilon_1 \\ Y_2^* &= \alpha_2 X_2 + \varepsilon_2 \end{aligned} \tag{5.1}$$

where X is a vector of various explanatory variables and ε_1 and ε_2 are zero-mean, constant-variance error terms:

$$\begin{aligned} E(\varepsilon_1) &= E(\varepsilon_2) = 0 \\ \text{Var}(\varepsilon_1) &= \text{Var}(\varepsilon_2) = 1 \\ \text{Cov}(\varepsilon_1, \varepsilon_2) &= \rho \end{aligned}$$

Note that the error terms of the two equations in (5.1) are correlated. This is different to estimating two univariate probit models, which would assume no correlation between the error terms. ρ accounts for the correlation between the two equations, and if it equals zero, the two equations can be estimated by the univariate probit technique (for details, see Greene 2003, pp. 710-2).

The technique of a bivariate probit with sample selection is used to estimate (5.1). The reason for this is that the dependent variables for (5.1) are binary but Y_2^* is observed only if $Y_1^* > 0$. The sample for the second equation is censored such that at least one restriction variable that affects Y_1^* but not Y_2^* is necessary

(see Assaad 1997; Greene 1992; Tunali 1986; Van De Ven and van Praag 1981). This technique allows us to let the two decisions be made simultaneously and to observe a process in which ethnicity affects employment choice.

Above all, this study helps us to look into ethnic differences in sector selection using the political-economy arguments developed earlier. Nonetheless, two points deserve attention. First, it is presumed that human capital theory is not appropriate in understanding the Malaysian context. Second, the approach allows us to lay bare the peculiarities of Malaysia's labour markets. It adds evidence on ethnicity and higher education in labour markets, which has been absent in the literature. In this connection, when interpreting estimation results of (5.1), particular attention is paid to ethnic differences, and thus to the signs of the coefficients more than magnitude of parameter estimates.

5.3.3 Variables

The dependent variables are binary, being created from the questions on labour force/employment status and sector of employment. WAGEEMPLOY corresponds with Y_1^* , and equals 1 if the respondent is engaged in wage employment but 0 otherwise (namely, self-employment, unpaid family employment, unemployed or outside labour force). SECTORCHOICE corresponds with Y_2^* and equals 1 if the respondent stated that he or she works in the public sector but 0 otherwise (namely, the private sector).

Explanatory variables are selected on the basis of the arguments and findings so far as well as the constraints of the present data sets. Table 5.8 describe those included in X_1 and/or X_2 in (5.1), together with the dependent variables, and the summary statistics are presented in Tables 5.9a and 5.9b. The whole sample is divided into men and women since their patterns of LFP (or wage employment participation in our present context) are significantly different, as seen later.

Various factors are considered to influence the decisions on participation in wage employment and on sector selection. Ethnicity affects them as the result of the institutional framework of labour markets, which is developed around the

ethnic factor. With Malays as the reference group, two ethnic dummies for Chinese (CHINESE) and Indians (INDIANS) are included. Besides ethnicity, the effects of age on the two decisions must be considered. Similar to the previous chapter, four five-year cohort dummies are included: 30-34, 35-39, 40-44, and 45-49. These dummies can also incorporate the possibility that marriage and child-bearing can influence women's decisions on wage employment participation and sector selection. Since the mean age of first marriage for women as of 2000 is 25.1 years old (Swee-Hock 2007, Table 7.1), it can be expected that their participation in wage employment goes downward from 25 years old of age.

Besides the generic characteristics, we also consider socio-economic variables on education attainment, current residence, marital status and the status within household. Firstly, four dummies are created from a question on educational attainment, with higher education attainment as the reference: NONE (without schooling or completed primary schooling), LOWERSEC (completed lower-secondary), UPPERSEC (upper-secondary) and POSTSEC (post-secondary). These dummies enable us to observe the impacts of varying levels of education completed on wage employment and sector selection decisions. Further, participation of wage employment and sector selection can be affected by local labour market conditions, which are proxied by dummy variables on current residence. They include states in which respondents reside (CRBORNEO, CRNORTHERN, CRSOUTHERN, and CRWESTERN), and semiurban (SEMIURBAN) and rural (RURAL) areas. Though they may not necessarily be exogenous depending on mobility, they still can influence labour market decisions since industry and services sectors tend to be concentrated in developed states and urban areas. Finally, turning to household-related variables such as marital status and status within household, dummy variables indicating head of household (HHHEAD) and marital status (MARRIED) are included. These variables can, though rather indirectly, allow us to investigate to what extent household responsibilities influence labour market decisions.

As pointed out in the previous chapter, the census data do not contain information on parental and household backgrounds as well as income and

expenditure. This makes it difficult to have some restriction variables in (5.1). Examples can be land ownership, father's occupational status (i.e., self-employed) or husband's occupational status (i.e., self-employed), none of which is available in the present data sets. Therefore, as the second-best solution, it is necessary to create restriction proxy variables out of the variables at hand. In this connection, we have two candidates. First, when estimating (5.1) for all ethnic groups, an interaction term (CHINESENONE) that is created through multiplying CHINESE by NONE can be used. The reason for this is that Chinese without schooling or with primary schooling are likely to be outside wage employment (see also Deremy and Chescher 1993). If so, then their wives are also considered to be self-employed. Second, when separately estimating (5.1) for Malays, Chinese and Indians, another interaction term (FEMALENONE) that is created by multiplying FEMALE by NONE can be used. It is because women without schooling can be considered to be outside wage employment and engaged in household responsibilities. As mentioned, these two restriction variables are included in the first selection equation where necessary, but it must be borne in mind that they are not necessarily perfect proxies.

Table 5.8 Description of Variables

<i>Variables</i>	<i>Description</i>
Ethnicity	
MALAY*	1 if Malay, 0 otherwise
CHINESE	1 if Chinese, 0 otherwise
INDIANS	1 if Indian, 0 otherwise
Age Cohort	
25-29*	1 if aged between 25 and 29, 0 otherwise
30-34	1 if aged between 30 and 34, 0 otherwise
35-39	1 if aged between 35 and 39, 0 otherwise
40-44	1 if aged between 40 and 44, 0 otherwise
45-49	1 if aged between 45 and 49, 0 otherwise
Education Attainment	
None	1 if no schooling or attained primary education, 0 otherwise
Lowersec	1 if attained lower secondary education, 0 otherwise
Uppersec	1 if attained upper secondary education, 0 otherwise
Postsec	1 if attained post secondary education, 0 otherwise
Higher*	1 if attained higher education, 0 otherwise
Current Residence (State)	
CRKLANGV*	1 if lives in Klang Valley (Kuala Lumpur or Selangor), 0 otherwise
CRBORNEO	1 if lives in Borneo states (Sabah, Sarawak or Labuan), 0 otherwise
CRNORTHERN	1 if lives in northern states (Kedah, Perlis, Kelantan or Trengganu), 0 otherwise
CRSOUTHERN	1 if lives in southern states (Johor, Pahang, Melaka or Negri Sembilan), 0 otherwise

CRWESTERN	1 if lives in western states (Penang or Perak), 0 otherwise
Current Residence (Area)	
URBAN*	1 if lives in urban area (with 75,000 persons and above), 0 otherwise
SEMIURBAN	1 if lives in semiurban area (with 1,000-74,999 persons), 0 otherwise
RURAL	1 if lives in rural area (with less than 999 persons), 0 otherwise
Household	
HHMEMBERS*	1 if not head of the household, 0 otherwise
HHHEAD	1 if head of the household, 0 otherwise
Marital Status	
NOTMARRIED*	1 if not married, 0 otherwise
MARRIED	1 if married, 0 otherwise

Note: * indicates the reference group.

Table 5.9a Descriptive Statistics of Variables

<i>Variables</i>	Wage employment		Outside wage employment
	Public sector	Private sector	
Ethnicity			
MALAY	0.867 (0.340)	0.499 (0.500)	0.576 (0.494)
CHINESE	0.084 (0.278)	0.362 (0.480)	0.352 (0.478)
INDIANS	0.049 (0.215)	0.139 (0.346)	0.072 (0.259)
Gender			
Male*	0.600 (0.490)	0.647 (0.478)	0.354 (0.478)
Female	0.399 (0.490)	0.353 (0.478)	0.646 (0.478)
Age Cohort			
25-29*	0.173 (0.378)	0.290 (0.454)	0.173 (0.379)
30-34	0.208 (0.406)	0.230 (0.421)	0.202 (0.401)
35-39	0.231 (0.421)	0.203 (0.402)	0.217 (0.412)
40-44	0.227 (0.419)	0.160 (0.367)	0.215 (0.411)
45-49	0.162 (0.368)	0.117 (0.322)	0.193 (0.395)
Education Attainment			
None	0.067 (0.250)	0.217 (0.412)	0.399 (0.490)
Lowersec	0.114 (0.317)	0.214 (0.410)	0.252 (0.434)
Uppersec	0.438 (0.496)	0.384 (0.486)	0.285 (0.451)
Postsec	0.083 (0.275)	0.045 (0.208)	0.028 (0.165)
Higher*	0.299 (0.458)	0.139 (0.346)	0.037 (0.188)
Current Residence (State)			
CRKLANGV*	0.245 (0.430)	0.368 (0.482)	0.235 (0.424)
CRBORNEO	0.109 (0.312)	0.068 (0.251)	0.090 (0.286)
CRNORTHERN	0.222 (0.416)	0.120 (0.325)	0.233 (0.423)
CRSOUTHERN	0.269 (0.443)	0.262 (0.440)	0.270 (0.444)
CRWESTERN	0.155 (0.362)	0.182 (0.386)	0.172 (0.377)
Current Residence (Area)			
URBAN*	0.509 (0.500)	0.638 (0.481)	0.458 (0.498)
SEMIURBAN	0.265 (0.441)	0.175 (0.380)	0.215 (0.411)
RURAL	0.226 (0.418)	0.187 (0.390)	0.326 (0.469)
Household			
HHMEMBERS*	0.434 (0.496)	0.513 (0.500)	0.731 (0.443)
HHHEAD	0.566 (0.496)	0.487 (0.500)	0.269 (0.443)
Marital Status			
NOTMARRIED*	0.117 (0.321)	0.276 (0.447)	0.146 (0.353)
MARRIED	0.883 (0.321)	0.724 (0.447)	0.854 (0.353)
Restriction Variable			
FEMALENONE	0.011 (0.107)	0.075 (0.264)	0.269 (0.444)
No. of Observations	14,723	41,748	56,778

Note: * indicates the reference group, and figures in parenthesis are standard deviations.

Table 5.9b Descriptive Statistics of Variables for Men and Women

Variables	Men			Women		
	Wage employment		Outside wage employment	Wage employment		Outside wage employment
	Public sector	Private sector		Public sector	Private sector	
Ethnicity						
MALAY*	0.894 (0.307)	0.511 (0.500)	0.537 (0.499)	0.826 (0.379)	0.477 (0.499)	0.597 (0.490)
CHINESE	0.054 (0.226)	0.357 (0.479)	0.405 (0.491)	0.130 (0.337)	0.369 (0.482)	0.323 (0.467)
INDIANS	0.052 (0.222)	0.131 (0.338)	0.057 (0.233)	0.044 (0.205)	0.154 (0.361)	0.080 (0.272)
Age Cohort						
25-29*	0.136 (0.343)	0.265 (0.441)	0.176 (0.381)	0.228 (0.419)	0.336 (0.472)	0.172 (0.377)
30-34	0.192 (0.394)	0.229 (0.420)	0.192 (0.394)	0.230 (0.421)	0.232 (0.422)	0.208 (0.406)
35-39	0.237 (0.425)	0.208 (0.406)	0.206 (0.404)	0.221 (0.415)	0.195 (0.396)	0.223 (0.416)
40-44	0.249 (0.432)	0.168 (0.374)	0.222 (0.416)	0.195 (0.396)	0.145 (0.352)	0.210 (0.407)
45-49	0.185 (0.388)	0.130 (0.337)	0.204 (0.403)	0.126 (0.332)	0.093 (0.291)	0.187 (0.390)
Education Attainment						
None	0.093 (0.290)	0.219 (0.414)	0.365 (0.481)	0.029 (0.168)	0.213 (0.410)	0.417 (0.493)
Lowersec	0.155 (0.361)	0.234 (0.423)	0.259 (0.438)	0.052 (0.222)	0.178 (0.382)	0.248 (0.432)
Uppersec	0.457 (0.498)	0.365 (0.481)	0.287 (0.452)	0.410 (0.492)	0.420 (0.494)	0.284 (0.451)
Postsec	0.067 (0.250)	0.042 (0.201)	0.031 (0.175)	0.106 (0.308)	0.051 (0.221)	0.026 (0.159)
Higher*	0.229 (0.420)	0.140 (0.347)	0.057 (0.233)	0.403 (0.491)	0.138 (0.345)	0.025 (0.157)
Current Residence (State)						
CRKLANGV*	0.226 (0.419)	0.357 (0.479)	0.224 (0.417)	0.272 (0.445)	0.389 (0.487)	0.241 (0.428)
CRBORNEO	0.112 (0.315)	0.075 (0.264)	0.093 (0.290)	0.106 (0.307)	0.054 (0.226)	0.088 (0.283)
CRNORTHERN	0.229 (0.420)	0.125 (0.331)	0.245 (0.430)	0.212 (0.409)	0.110 (0.313)	0.226 (0.418)
CRSOUTHERN	0.272 (0.445)	0.268 (0.443)	0.265 (0.442)	0.263 (0.440)	0.251 (0.434)	0.273 (0.446)
CRWESTERN	0.161 (0.367)	0.175 (0.380)	0.172 (0.378)	0.146 (0.354)	0.196 (0.397)	0.172 (0.377)

Current Residence (Area)						
URBAN*	0.488 (0.500)	0.626 (0.484)	0.436 (0.496)	0.540 (0.498)	0.660 (0.474)	0.470 (0.499)
SEMIURBAN	0.275 (0.447)	0.184 (0.388)	0.209 (0.407)	0.250 (0.433)	0.159 (0.366)	0.219 (0.413)
RURAL	0.237 (0.425)	0.189 (0.392)	0.355 (0.478)	0.210 (0.408)	0.181 (0.385)	0.311 (0.463)
Household						
HHMEMBERS*	0.116 (0.320)	0.305 (0.460)	0.329 (0.470)	0.914 (0.280)	0.897 (0.304)	0.951 (0.216)
HHHEAD	0.884 (0.320)	0.695 (0.460)	0.671 (0.470)	0.086 (0.280)	0.103 (0.304)	0.049 (0.216)
Marital Status						
NOTMARRIED*	0.082 (0.275)	0.244 (0.430)	0.248 (0.432)	0.168 (0.374)	0.335 (0.472)	0.090 (0.286)
MARRIED	0.918 (0.275)	0.756 (0.430)	0.752 (0.432)	0.832 (0.374)	0.665 (0.472)	0.910 (0.286)
Restriction Variable						
CHINESENONE	0.004 (0.064)	0.093 (0.290)	0.147 (0.354)	0.002 (0.047)	0.060 (0.237)	0.149 (0.356)
No. of Observations	8,845	27,025	20,097	5,878	14,723	36,681
Note: * indicates the reference group, and figures in parenthesis are standard deviations.						

Note: * indicates the reference group, and figures in parenthesis are standard deviations.

5.4 Empirical Results

5.4.1 Descriptive Results

Before examining estimation results, descriptive results obtained from the present sample are presented. All the tables point to the situation in year 2000. This aims to add some basic information on employment choice, but for analytical purposes, those related to public-private choice are presented here. The tables on unemployment are placed in Appendix B and C, in order to avoid misunderstanding of the main purpose of this empirical study (to test the hypotheses developed in section 5.2.2).

Unsurprisingly, LFP rates differ among ethnic group and gender.⁷⁶ The overall rate is 70.6 percent, but the rates for Malays, Chinese and Indians are 69.3 percent, 72.2 percent and 73.7 percent respectively. It can be said that the ethnic differential is not necessarily large. By contrast, there is a large gender differential (see Table 5.10). It is immediately found from the last row that the LFP rate of women is 45.0 percent, which is extremely low relative to 96.9 percent of men. More interestingly, the table indicates that in the case of women there is an association between LFP rate and educational backgrounds. It shows that the higher the educational background the more likely to participate in the labour force. Indeed, the LFP rate of women with higher educational backgrounds is 88.1 percent, which is not so different from 96.8 percent of men with same educational backgrounds. In contrast, the LFP rate for men is high for all educational categories. Above all, all these findings can be the empirical rationale for estimating equation (5.1) for men and women.

When it comes to employment and unemployment rates, there is no marked ethnic difference (see Table 5.11). Since the present sample is restricted to those

⁷⁶ The labour force refers to persons “who were either employed or unemployed during the last seven days before the date of interview (Department of Economics 2000b, xxi).” According to Census, the employed persons are defined as: “those who were working at least one hour during the reference week for pay (in cash or kind), profit or family gain. Included in this category are those who did not work during the reference week due to illness, injury, handicapped / disability, bad weather, vacation, labour dispute and social or religious reasons but having a job to return to (*ibid*, xxii).” Thus, those who are not employed but are in the labour force are defined as the unemployed.

aged between 25 and 49 years old, the result is different from Table 1.4. This finding from Table 5.11, however, does not mean that the three ethnic groups opt for similar jobs. As seen shortly, Malays are more likely to be employed in the public sector, but Chinese and Indians tend to work in the private sector.⁷⁷

Table 5.10 LFP Rate by Educational Attainment and Gender

	Male	Female	Total
None/Primary	95.0	29.5	57.7
Lower Secondary	97.4	33.7	66.7
Upper Secondary	98.0	52.6	75.6
Post Secondary	97.0	65.9	81.5
Higher	96.8	88.1	93.0
Total	96.9	45.0	70.6

Table 5.11 Employment and Unemployment Rates by Ethnicity

	Employed	Unemployed	Total
Malay	97.7	2.3	100.0
Chinese	97.7	2.3	100.0
Indians	97.8	2.2	100.0
Total	97.7	2.3	100.0

Now turning to type of employment, which is the primary focus of this chapter, the relationship between ethnicity and type of employment is presented in Table 5.12. At the first sight, it is seen that rates of participation in wage employment differ among the three ethnic groups. It indicates that the ways in which Malays, Chinese and Indians enter the sample of the wage employed are non-random. Besides the findings on LFP from Table 5.10, therefore, these findings justify the use of bivariate probit with sample selection technique (see section 5.3.2).

⁷⁷ In order to concentrate on the main research topic here (namely, public-private employment choice), the tables on unemployment using the same sample are listed in Appendix B and C. They reveal some interesting findings on unemployment. First, it is found that the younger you are the more likely to be unemployed. This is particularly true of Malays. Second, it is found that those with lower level of education attained are more likely to be unemployed. This clearly holds true of Chinese and Indians. Yet, in the case of Malays, those with upper secondary schooling suffer most from unemployment.

In parallel, we can see several findings from Table 5.12. First, it is shown that slightly less than 20 percent of the total employed is employed by the public sector. The proportions of private sector employment and self employment are 53.5 percent and 27.7 percent respectively.⁷⁸ Overall, wage employment absorbs 72.3 percent of the total employed. Second, as expected, the Malay dominance in public sector employment can be seen. More or less 30 percent of Malays employed are in the public sector, whereas the corresponding figures for Chinese and Indians are just 4.9 percent and 9.3 percent. Third, Chinese seem to be over-represented in self-employment and Indians in private sector employment. Above all, ethnic differences in sector selection are clearly found.

Table 5.12 Ethnicity and Type of Employment

	Wage Employment		Self Employment	Total
	Public Sector	Private Sector		
Malay	28.5	46.5	25.0	100.0
Chinese	4.9	58.9	36.2	100.0
Indians	9.3	76.0	14.7	100.0
Total	18.8	53.5	27.7	100.0

Next, the relationship between educational backgrounds and type of employment is presented in Table 5.13. It demonstrates two interesting findings. First, it is indicated that the higher the educational background the more likely the worker is to be employed in the public sector. Together with the findings from Table 5.12, it follows that the public sector is a large employer of Malays with higher educational backgrounds. To see if this is true of all ethnic groups, however, this point is to be investigated further in section 5.4.3. Second, we can see that the lower the educational background the more likely to be self-employed. For example, 45 percent of those without or with primary schooling are self-employed, but only 9.6 percent of those with higher educational

⁷⁸ The self-employed person is “a person who works on his own and does not employ workers although he may have assistants comprising family members (Department of Statistics 2000b, xxiii).”

backgrounds are. It suggests that Chinese workers without or with primary schooling are most likely to be self-employed. By contrast, there is no clear pattern between educational backgrounds and private sector employment.

Table 5.13 Educational Backgrounds and Type of Employment

	Wage Employment		Self Employment	Total
	Public Sector	Private Sector		
None/Primary	5.4	49.6	45.0	100.0
Lower Secondary	10.4	55.4	34.2	100.0
Upper Secondary	22.5	55.9	21.6	100.0
Post Secondary	32.3	50.4	17.3	100.0
Higher	38.9	51.5	9.6	100.0
Total	18.8	53.4	27.7	100.0

Before carrying out econometric analysis of public-private employment choice, it is useful to look at two more tables that complement the findings from Tables 5.12 and 5.13. Now, we look at public sector employment. Table 5.14 follows Table 5.6 to update the information, though it must be borne in mind that the present sample includes those aged between 25 and 49 years old only. The table shows a number of interesting points, but I focus on those related to higher education and ethnicity in order to maintain the analytical consistency with the rest of this chapter.

First, Malays are, as expected, over-represented in public sector employment, accounting for 86.7 percent of the public sector jobs. Second, Chinese and Indians opt for private sector employment, but the pattern between them is not necessarily the same. Chinese are the majority group in trade and finance sectors, but Indians are over-represented in agriculture and manufacturing sectors. Lastly, it is seen that those with higher educational backgrounds are over-represented in the public sector and the finance sector. It can be surmised that Malay graduates tend to choose public sector employment whereas non-Malay, especially Chinese, graduates are likely to work in financial sector.

Having established the finding on the Malay dominance in public sector employment, Table 5.15 breaks down public sector jobs by ethnicity and gender. First, the dominance of Malay men is striking in that they accounted for more than half of the public sector employees. Second, the extremely high representation of Malays is found in public administration jobs, amounting to 91.5 percent (see also Table 5.4 that presumably used a wider sample than the present one). Indeed, the share of Malay men in this category was as high as 70.1 percent. Finally, when it comes to education (teachers etc) and health (doctors and nurses etc), women's proportion exceeded men's. For example, women accounted for 61.8 percent of the education jobs, and 61.1 percent of the medical jobs. This suggests that the education and medical services provide women with job opportunities.

Table 5.14 Public and Private Sectors Employment by Ethnicity and Gender

	Public Sector	Private Sector					Malaysia Total
		Agriculture	Manu- facturing	Services			
				Transport	Trade	Finance	
Education							
None/Primary	6.7	58.9	22.3	22.5	22.1	5.0	28.9
Lower Sec	11.4	19.8	23.8	25.5	25.4	8.1	22.0
Upper Sec	43.8	16.2	40.1	38.6	40.5	44.6	34.2
Post Sec	8.3	1.2	4.0	4.0	4.6	8.0	4.2
Higher	29.9	3.9	9.8	9.3	7.4	34.5	10.9
	100	100	100	100	100	100	100
Ethnicity							
Malays	86.7	54.3	55.7	58.1	34.2	44.4	58.6
Chinese	8.4	17.6	24.8	25.2	55.3	44.7	32.1
Indians	4.9	28.1	34.9	16.7	10.5	10.9	9.4
	100	100	100	100	100	100	100

Note: The type of industry was selected to be consistent with Table 5.6.

Table 5.15 Ethnicity, Gender and Public Sector Jobs

	Malay			Chinese			Indians			Total
	T	M	F	T	M	F	T	M	F	
Public Administration	91.5			4.3			4.3			100.0
		70.1	21.3		2.5	1.7		3.6	0.6	
Education	82.6			13.2			4.2			100.0
		33.6	49.0		3.2	10.0		1.3	2.8	
Health	82.5			9.8			7.7			100.0
		33.0	49.5		3.0	6.8		2.9	4.8	
Other Public Services	81.8			9.5			8.8			100.0
		53.4	28.4		4.1	5.4		7.4	1.4	
All Others	82.8			10.1			7.1			100.0
		59.9	22.9		6.0	4.1		5.8	1.3	
TOTAL	86.7			8.4			4.9			100.0
		53.7	33.0		3.2	5.2		3.1	1.8	

Note: T (total), M (male), F (female); Other Public Services include community social and personal service activities, private household with employed persons, and extra-territorial organization and bodies; All Others include agriculture, mining/quarrying, manufacturing, electricity/gas/water, construction, wholesale and retail, and transport/communications etc.

5.4.2 Estimation Results: Between-Group Differences

Hypothesis 1 is tested by estimating equation (5.1), and the results for men and women are presented in Table 5.16. Having estimated separately for men and women, the first column gives the results for the first selection equation (participation in wage employment) and the second column the substantive equation (sector selection). And for both men and women, log-likelihood tests reject the null hypothesis that all variables are jointly zero. For men, the log-likelihood Chi-squared statistic is 5727.15 with 18 degrees of freedom, which is significant at 1 percent level of significance. For women, it is 6161.73 with 18 degrees of freedom, and is similarly significant at 1 percent level of significance.

Turning to the correlation between the selection equation and the substantive equation, it is found that for both men and women the error terms of the two equations are correlated. In the case of men, the log-likelihood test rejects at 1 percent level of significance the null hypothesis that ρ (rho) equals zero. In the case of women, it does so at 5 percent level of significance. This clearly demonstrates that the two decisions are not made separately. At empirical level, this justifies the two-stage bivariate probit estimation by controlling for sample selection. At analytical level, this suggests that, when making decisions, various

ethnic groups take into account government labour market policies that are formed on the basis of the equity-efficiency trade-off. Alternatively, it can be argued that expectations to secure waged jobs influence their decisions to participate in wage employment.

Several interesting points, though not surprising in light of the arguments and findings so far, are immediately found from the table. First of all, there are clear ethnic differences in sector selection for both men and women. Since the reference group is Malays with higher educational backgrounds, it can be argued that Malays are most likely to go into the public sector, conditional on higher education backgrounds and gender. Put differently, it is Malay graduates who are most likely to take public sector jobs, and the government is a large employer of them. These findings support Hypothesis 1.

By contrast, it is found that Chinese and Indians choose private rather than public sector employment. Interestingly, the signs of the coefficient on CHINESE in the first selection equations are negative for both men and women. This indicates that government labour market policies divert some Chinese graduates away from wage employment and consequently, they are self-employed, unemployed or outside the labour force. On the other hand, the corresponding signs for Indians are positive, meaning that Indian graduates are more likely to be wage-employed than Malays. But, the results from the sector selection equations show that Indian men and women tend to work in the private sector even though they enter wage employment. Above all, all these findings point to a strong association between Malay graduates and public sector employment, and supplement the finding that Malay graduates are most likely to work in the public sector.

Unsurprisingly, then, we can see for men and women that the higher the attainment the more likely workers are to be in wage employment and in public sector employment. All the signs of the coefficients on the education dummies are negative for men and women. This complements the finding that Malay graduates are most likely to go into the public sector. When it comes to the magnitudes of the coefficients, they are larger for women than for men. In a

sense, this implies the presence of gender difference in labour market decisions, but it ought to be tested in the next section by estimating separate regressions by ethnicity.

Turning to the coefficients on age cohort dummies, two points are found. The first point is that the older the worker the more likely the worker is to be outside wage employment. In general, this tendency holds true of both men and women, but the magnitudes of the coefficients on these dummies in the participation equations are larger for men than women. On the one hand, most of the men who chose to be outside wage employment appear to be self-employed in the light of their high LFP rates and low unemployment rates for the entire sample (see Tables 5.10 and 5.11). On the other hand, it may mean that most of the older women, who are outside wage employment, seem to be outside the labour force when taking into account low LFP rates for women found from Table 5.10. It can follow that marriage and child-bearing might influence women's decisions to enter the labour force. The second point that emerges from the age cohort dummies is that, when choosing wage employment, the older the worker the more likely the worker is to choose public sector employment. It is particularly so with women more than men. The tentative explanation is that the public sector provides job opportunities for the older workers and also the married women. Indeed, for the latter, the sign of the coefficient on MARRIED in the women's sector selection equation indicates it.

The signs of the coefficients on HHHEAD and MARRIED are to some extent illustrative of the effects of household responsibilities on labour market decisions, though the constraints of the present data do not allow us to investigate them in detail. The male heads of the household, most of whom are usually married, are likely to be wage employed and generally choose public rather than private sector employment. This may indicate that job security in the public sector is an important factor for them when making labour market decisions, since self-employment and private sector employment are more influenced by economic cycles. In contrast, the female heads of the household are likely to be in wage employment, but no clear pattern is observed in terms of sector selection. Indeed, the coefficient on HHHEAD in the women's sector selection equation is

statistically insignificant. On the other hand, when it comes to marriage, an interesting story can be seen. The econometric results show that married women tend to be outside wage employment, but once in wage employment, they are more likely to be in the public rather than the private sector. Taking into account the lower LFP rates for women (see Table 5.10), this may indicate that if the prospects of securing public sector jobs are high, then married women choose to join the labour force and enter wage employment.

Finally, turning to current residence dummies, a similar result is found for both men and women. The public sector provides more employment opportunities in less developed states (CRBORNEO and CRNORTHERN) and semiurban (SEMIURBAN) and rural (RURAL) areas than does the private sector. This is hardly surprising since the private sector jobs are concentrated in more developed states and urban areas. Nonetheless, these dummies must be interpreted with some caution. For, the reported place of residence may be the consequence rather than cause of labour market decisions. That is to say, these individuals reside in less developed and rural areas because of their jobs. Since the present data does not contain information to investigate the causal relationship between place of residence and labour market status, the question of the causality must be investigated comprehensively in future.

Table 5.16 Results for the Sector Selection Equation: Coefficient Estimates

	Men		Women	
	Participation in Wage Employment	Sector Selection	Participation in Wage Employment	Sector Selection
Constant	1.211*** (0.025)	-0.702*** (0.044)	1.695*** (0.028)	-0.430*** (0.036)
CHINESE	-0.508*** (0.015)	-0.971*** (0.066)	-0.074*** (0.016)	-1.018*** (0.040)
INDIANS	0.255*** (0.022)	-0.685*** (0.028)	0.394*** (0.020)	-0.709*** (0.044)
30-34	-0.154*** (0.018)	0.236*** (0.024)	-0.121*** (0.018)	0.256*** (0.031)
35-39	-0.240*** (0.019)	0.463*** (0.025)	-0.132*** (0.018)	0.496*** (0.032)
40-44	-0.321*** (0.019)	0.738*** (0.027)	-0.110*** (0.019)	0.840*** (0.037)
45-49	-0.390*** (0.021)	0.819*** (0.028)	-0.246*** (0.021)	1.022*** (0.041)
None	-0.907*** (0.025)	-0.596*** (0.067)	-1.698*** (0.027)	-1.987*** (0.184)
Lowersec	-0.618*** (0.022)	-0.407*** (0.044)	-1.566*** (0.025)	-1.413*** (0.152)
Uppersec	-0.410*** (0.021)	-0.192*** (0.028)	-0.990*** (0.023)	-0.750*** (0.082)
Postsec	-0.322*** (0.034)	-0.061 (0.038)	-0.613*** (0.034)	-0.294*** (0.057)
CRBORNEO	0.029 (0.022)	0.697*** (0.039)	-0.145*** (0.024)	1.056*** (0.045)
CRNORTHERN	-0.328*** (0.019)	0.494*** (0.023)	-0.281*** (0.019)	0.571*** (0.036)
CRSOUTHERN	0.013 (0.016)	0.232*** (0.022)	0.001 (0.017)	0.317*** (0.031)
CRWESTERN	0.018 (0.018)	0.274*** (0.026)	0.037** (0.018)	0.238*** (0.035)
SEMIURBAN	-0.162*** (0.015)	0.292*** (0.019)	-0.149*** (0.016)	0.382*** (0.029)
RURAL	-0.478*** (0.016)	0.191*** (0.025)	-0.183*** (0.017)	0.176*** (0.033)
HHHEAD	0.218*** (0.016)	0.127*** (0.028)	0.213*** (0.025)	0.019 (0.042)
MARRIED	0.132*** (0.018)	0.060** (0.028)	-0.752*** (0.017)	0.465*** (0.051)
CHINESENONE	0.236*** (0.026)		-0.168*** (0.029)	
Rho	-0.697 (0.531)		-0.295 (0.113)	
Log-Likelihood	-48,616.79		-38,863.36	
No. of Observations	55,967	35,870	57,282	20,601

Note: Figures in parenthesis are standard errors; *** $p < .01$, ** $p < .05$, * $p < .10$.

5.4.3 Estimation Results: Within-Group Differences

Hypothesis 2 is tested through separately estimating equation (5.1) by ethnicity, and the results are presented in Table 5.17. Having estimated separately for the three ethnic groups, the first column gives the results for the first selection equation (participation in wage employment) and the second column the substantive equation (sector selection). For all the ethnic groups, log-likelihood tests reject the null hypothesis that all variables are jointly zero. The log-likelihood Chi-squared statistics are 5562.02 for Malays and 2084.92 for Chinese with 17 degrees of freedom respectively, and both of them are significant at 1 percent level of significance. For Indians, the log-likelihood Chi-squared statistic is 519.01 with 16 degrees of freedom, since CRBORNEO was automatically dropped due to collinearity.⁷⁹ It is also statistically significant at 1 percent level of significance.

Turning to the correlation between the selection equation and the substantive equation, it is found for all the ethnic groups that the error terms of the two equations are highly correlated and that the log-likelihood test rejects at 1 percent level of significance the null hypothesis that ρ (rho) equals zero. This confirms the earlier argument that the two decisions are made simultaneously rather than separately. Once again, this fact justifies using the technique of a bivariate probit with sample selection. Further, it can be stated in terms of the high magnitudes of ρ (rho) that prospects of waged jobs are very important, especially for Indians, to decide whether they choose to be wage-employed. On the other hand, it is less so for Chinese, many of whom choose to be self-employed (see Table 5.12).

It is immediately seen from the female dummy that Hypothesis 2 does not hold true for all the ethnic groups. This is an interesting finding, which contradicts the previous argument in the literature that men were over-represented in public sector employment (Ariffin 1992, 1994; Khasnor 1984). Indeed, our estimation results demonstrate that, once controlling for sample selection problem, women are more likely to go into the public sector than men, conditional on higher education achievement and ethnicity. This indicates that female graduates are

⁷⁹ The STATA package automatically drops the variables that suffer from collinearity. For this reason, the coefficient estimates on the variable are not listed in the table.

most likely to work in the public sector, irrespective of ethnic backgrounds. This is also supported by the coefficients on the education dummies (None, Lowersec, Uppersec and Postsec), which are either negatively signed or statistically insignificant. They show that the higher the educational background the more likely the person is in wage employment and works in the public sector.

Taking into account the findings on Hypothesis 1, it can also be argued that Malay female graduates are most likely to work in the public sector. Presumably, this tendency seems to apply in recent times, since the probability of higher education enrolment becomes higher for women than men (see Chapter 4). Further, these findings carry more significance when turning our eyes to the results for the first selection equations. For Malays, Chinese and Indians, all the signs of the coefficients on the female dummy are negative, indicating that women enter wage employment given the expectations to obtain public sector jobs, such as teachers and nurses etc (see Table 5.15). It points to the significance of public sector employment for female graduates, since their labour market status can be influenced by job opportunities in the public sector.

Some other points, though of secondary importance against the purpose of this research, are to be raised in relation to the findings from Table 5.16. Perhaps this is useful to highlight some future research topics on Malaysia's labour markets. First, the earlier findings on age and sector selection hold true of all the ethnic groups. For Malays, Chinese and Indians, it is that the older the worker the more likely the worker is to be outside wage employment. When choosing wage employment, however, the older the person the more likely the person chooses public sector employment. Although the reason for this remains unknown from the present data set and has to be investigated in the future research, this may indicate that the older individuals prefer stable public sector jobs or that the public sector used to absorb a larger proportion of the labour force.

In contrast, when it comes to current residence, there is no clear pattern. Earlier, we found that the public sector provides more employment opportunities in less developed states (CRBORNEO and CRNORTHERN) and semiurban (SEMIURBAN) and rural (RURAL) areas than does the private sector. This

tendency is true of Malays and Chinese, but it is not so clear in the Indian case. The reason for this is unknown from the present data sets, and has to be investigated in future research.

By the same token, mixed results are found for the effect of HHHEAD. It was found earlier that the male heads of the household generally choose public sector employment but no clear pattern is observed for female heads of the household. Table 5.17 shows that, regardless of ethnic background, being the head of the household reduces the likelihood of being in public sector employment. By contrast, it is seen from the coefficients on MARRIED that married individuals are more likely to be outside wage employment, but when choosing it, they are more likely to work in the public sector. This coincides with the earlier finding on married women, but contradicts with the one on married men (see Table 5.16). All these mixed findings on HHHEAD and MARRIED suggest that the relationship between household responsibilities and labour market decisions be researched comprehensively in future.

5.5 Conclusions

As far as labour markets are concerned, the fundamental concern of the government has been to strike a balance between inter-ethnic distribution (equity) and economic growth (efficiency). The institutional framework of labour markets is grounded on the equity-efficiency trade-off, where the public-private differentials in terms of employment practices, fringe benefits and trade union activities are arranged in favour of Malays. Naturally, then, all this constitutes the environment in which various ethnic groups make different labour market decisions.

The empirical analysis using the *Population and Housing Census Malaysia 2000* revealed two major findings on ethnicity and educational background in labour markets. First, there are, hardly surprisingly, ethnic differences in sector selection, and Malays graduates are most likely to go into the public sector. Importantly, this fact suggests that the fundamental cause of the graduate unemployment concentrated amongst Malays is the institutional framework set

up by the government (see also Chapter 1). Since the absorptive capacity of the public sector is rather limited relative to the private sector (see Table 5.12), many Malay graduates are likely to be queuing up for public sector employment. This can mean that increased government expenditure for higher education on the ground of the existing institutional framework of higher education and labour markets may generate more Malay unemployed graduates.

Further, it was also found that women are more likely to work in the public sector than men, conditional on higher educational achievement and ethnic background. This is a surprising but interesting result since the previous studies in the literature pointed to the male dominance in public sector jobs. If we combine this result from the finding on ethnic differential in sector selection, it can be argued that it is indeed Malay female graduates who are most likely to choose public sector employment. Since women are now more likely to enrol higher education than men (see Chapter 4), the extent to which the public sector creates job opportunities not only for Malays but also for women will be crucial as far as graduate unemployment is concerned.

This chapter also found that many other factors, such as age, current residence, household and marital status, also played pivotal roles in labour market decisions, though its main purpose is to investigate the role of ethnicity in Malaysia's labour markets. Indeed, the findings on some of these factors are mixed, and therefore, they can be important future research topics in order to further deepen our understanding of Malaysia's labour markets.

Table 5.17 Results for Separate Sector Selection Equations by Ethnicity: Coefficient Estimates

	Malays		Chinese		Indians	
	Participation in Wage	Sector Selection	Participation in Wage	Sector Selection	Participation in Wage	Sector Selection
Constant	1.591*** (0.026)	-0.625*** (0.028)	1.291*** (0.030)	-1.815*** (0.105)	1.338*** (0.066)	-0.706*** (0.066)
Gender						
Female	-0.456*** (0.016)	0.432*** (0.018)	-0.230*** (0.020)	0.580*** (0.041)	-0.544*** (0.038)	0.422*** (0.041)
Age Cohort						
30-34	-0.119*** (0.016)	0.193*** (0.018)	-0.173*** (0.023)	0.374*** (0.050)	-0.069* (0.042)	0.144*** (0.049)
35-39	-0.120*** (0.016)	0.371*** (0.019)	-0.266*** (0.023)	0.532*** (0.051)	-0.174*** (0.042)	0.343*** (0.051)
40-44	-0.147*** (0.018)	0.606*** (0.021)	-0.315*** (0.024)	0.832*** (0.056)	-0.173*** (0.043)	0.471*** (0.057)
45-49	-0.239*** (0.019)	0.715*** (0.023)	-0.366*** (0.026)	0.986*** (0.061)	-0.343*** (0.047)	0.610*** (0.060)
Education Attainment						
None	-1.411*** (0.025)	-0.332*** (0.037)	-0.854*** (0.030)	-0.965*** (0.200)	-0.696*** (0.064)	-0.265*** (0.088)
Lowersec	-1.186*** (0.022)	-0.220*** (0.027)	-0.963*** (0.027)	-0.772*** (0.174)	-0.669*** (0.059)	-0.156** (0.072)
Uppersec	-0.785*** (0.020)	-0.146*** (0.019)	-0.591*** (0.026)	-0.404*** (0.096)	-0.462*** (0.060)	-0.169*** (0.060)
Postsec	-0.515*** (0.030)	-0.072** (0.029)	-0.285*** (0.043)	0.031 (0.062)	-0.535*** (0.091)	0.028 (0.090)

Current Residence (State)		Current Residence (Area)		Household		Marital Status		Restriction Variable		Rho		Log-Likelihood		No. of Observations	
CRBORNEO	-0.050** (0.024)	0.646*** (0.028)	-0.048** (0.023)	0.820*** (0.067)	-	-									
CRNORTHERN	-0.382*** (0.016)	0.521*** (0.018)	-0.171*** (0.033)	0.638*** (0.071)	0.156*** (0.052)	-0.035 (0.060)									
CRSOUTHERN	-0.080*** (0.016)	0.230*** (0.017)	0.064*** (0.020)	0.299*** (0.053)	0.079** (0.034)	0.030 (0.040)									
CRWESTERN	0.011 (0.019)	0.179*** (0.020)	0.008 (0.020)	0.212*** (0.047)	-0.023 (0.034)	0.172*** (0.041)									
SEMIURBAN	-0.109*** (0.015)	0.256*** (0.017)	-0.278*** (0.018)	0.499*** (0.039)	-0.069*** (0.032)	0.086*** (0.036)									
RURAL	-0.330*** (0.013)	0.206*** (0.016)	-0.391*** (0.030)	0.527*** (0.067)	0.167*** (0.039)	-0.249*** (0.047)									
HHHEAD	0.540*** (0.016)	-0.176*** (0.020)	0.261*** (0.020)	-0.163*** (0.045)	0.452*** (0.038)	-0.290*** (0.045)									
MARRIED	-0.257*** (0.015)	0.390*** (0.018)	-0.436*** (0.018)	0.311*** (0.046)	-0.257*** (0.034)	0.256*** (0.039)									
FEMALENONE	-0.136*** (0.022)		-0.574*** (0.031)		-0.054 (0.041)										
		-0.904 (0.011)	-0.618 (0.102)			-0.968 (0.015)									
		-55359.43	-24562.64			-8230.98									
	66,313	33,607	36,314	16,336	10,622	6,528									

Note: Figures in parenthesis are standard errors; *** $p < .01$, ** $p < .05$, * $p < .10$.

Chapter 6

Public-Private Choice in Higher Education and Labour Markets with Reference to Ethnicity

6.1 Introduction

As seen in Chapters 4 and 5, the role of government in higher education and labour markets is of paramount importance in the Malaysian context. Primarily based on inter-ethnic concerns, the government constructs and manages higher education and labour markets. On the one hand, the role of higher education in maintaining social stability is highlighted, so that it is located as an important device of achieving inter-ethnic equity (see Chapter 4). The equity concerns form the institutional basis on which such instruments as the ethnic quota system and the government control over provision of higher educational services are put in place. Despite the introduction of the higher education reforms from the mid-1990s, the fundamental environment did not change. The role of government did not decline but rather expanded, giving rise to the dualistic structure within higher education: the public higher education institutions with ethnic concerns and the private higher education institutions without them.

And the same with the labour markets (see Chapter 5). The government's equity and efficiency concerns lay the foundation on which the institutional framework of labour markets is constructed. The public sector is attached importance in terms of equity concerns, whilst the private sector efficiency concerns. Consequently, various public-private differentials are observable in employment practices, fringe benefits and trade union activities, all of which in general favour Malays.

Above all, Malaysia's higher education and labour markets, especially the context in which ethnicity carries much significance in determining access to higher education and sector of employment, cannot be understood adequately without considering these institutional frameworks. The ethnic differences in

higher educational enrolment are persistently evident, though the content and magnitude of the differences have varied over time. Further, the 1990s witnessed a dramatic change in the landscape of higher education, indicating that an ethnic divide in enrolment patterns between public and private/overseas higher education started to emerge very clearly (see Chapter 4; Aihara 2009). On the other hand, Malays have continued to be over-represented in public sector employment but Chinese and Indians in private sector employment. Indeed, the higher the educational background the more likely the workers are employed in the public sector, and Malay graduates are indeed most likely to work in the public sector.

These arguments and findings on the ethnic differentials in higher education enrolment and sector selection in labour markets are significant on their own. They would be more so when analysed jointly rather than separately. It is for this reason that this chapter is devoted to the study of the persistence of the ethnic factor from higher education through to labour markets. Human capital theory neglects the role of government, which indeed has profound implications in the Malaysian context. The ramification is that it does not have the capacity to explain why and how the ethnic factor persists from higher education through to labour markets. Hence, it is essential to start by putting the role of government to the fore.

This chapter is structured as follows. The next section looks at the persistence of ethnicity from higher education through to labour markets with reference to both the findings so far and previous studies. Accordingly, it aims to set up two empirical hypotheses. Section 6.3 develops empirical strategy to test them, and Section 6.4 discusses the empirical results. Section 6.5 summarises the main findings and concludes.

6.2 The Persistence of Ethnicity from Higher Education through to Labour Markets

In general, the NEP was built on the equity-efficiency trade-off, and was based on win-win principle that it is not necessary to rob Peter to pay Paul. To correct

the inter-ethnic socio-economic imbalances that had resulted in the racial riots in 1969, it empowered the government with distributing the economic pie that the private sector was expected to increase. The government's equity concerns mean that the socio-economic position of Bumiputeras, in particular Malays, should be brought up to that of non-Bumiputeras, namely Chinese and Indians. Higher education and labour market policies were attached great significance towards the end (see Chapters 4 and 5). Put differently, this suggests that the ethnic factor continues to carry significance from higher education through to labour markets.

Some previous studies point to the persistence of the ethnic factor from (higher) education through to labour markets, though they are not as explicit as in this chapter. Wang (1977) investigated final year students at some upper secondary schools in Penang and nearby areas in the early 1970s, and suggested that the selection of subjects at upper secondary and higher levels of schooling is influenced by government policy. It was argued that Malays and non-Malays are well aware of public-private differentials in terms of labour market opportunities and that their choice of subjects reflected this. In the 1980s, Buan, Kim and Yong (1987) used a sample of students at upper secondary schools nationwide and found that Bumiputeras chose the government as the future employer after university more than did non-Bumiputeras. Similarly, the Malay tendency to choose public service was also reported by Yoong, Haron and Marimuthu (1987) who surveyed final year undergraduates at five local public universities. These findings suggest that the decision on higher education enrolment is related to the decision on sector selection in future labour markets.

When it comes to the 1990s, some studies suggested in informal discourse that Malays opt for public higher education whereas Chinese and Indians private higher education (for example, Alias 1997; Lee 1996, 1999, 2004; Samuel and Liew 1997; Tan 2002). Further, Noran and Ahmad (1997, cited in Tan 2002, pp. 92) looked at the patterns of employment after graduation, and indicated that Bumiputeras, mainly Malays, work in the public sector.

As such, previous studies are indicative of the persistence of the ethnic factor from (higher) education through to labour markets. But the relationship between

the type of higher education and sector selection in labour markets is yet to be addressed explicitly. Presumably, part of the reason is that type of higher education, either public or private/overseas, was not the primary policy target in the 1970s and 1980s, when private sector involvement in higher education was heavily restricted. Nonetheless, it is unfortunate that there are no studies on this, especially because Malaysia went through a series of higher education reforms from the mid-1990s. The decade witnessed the emergence of a dualistic structure in higher education, especially between public and private/overseas education (see Chapter 4; Aihara 2009). This is where the present chapter has something new to offer by putting to the fore the persistence of ethnicity from higher education through to labour market decisions.

As seen in Chapters 4 and 5, the government has shaped higher education and labour markets to make sure that the output of higher education is rewarded in labour markets in order to satisfy the government's equity concerns. This suggests that the institutional frameworks of higher education and labour markets set structural conditions and constraints which various ethnic groups take into account when making decisions on higher education enrolment and sector selection. Besides the findings in Chapters 4 and 5, these arguments point to two hypotheses that correspond to both sides of the same coin:

Hypothesis 1: Malays enrol in public higher education institutions, and work in the public sector.

Hypothesis 2: Chinese and Indians enrol in private or overseas higher education institutions, and work in the private sector.

These hypotheses indicate that ethnicity plays an important role in making higher education and sector selection decisions, and also that these decisions are mutually related or likely to be made simultaneously. The inter-relationship between higher education and sector selection decisions can be explained in two ways. First, labour market prospects can influence the decisions on type of higher education (i.e., public or private). For example, some Malays may have chosen public higher education with public sector jobs in mind. Alternatively, some

Chinese and Indians may have enrolled at private higher education institutions with private sector employment in mind. Second, type of higher education attained (i.e., public or private) can determine type of sector of employment. Other Malays work for the government because of their choice of public higher education. An example of this is government scholarship. Those who receive government scholarship are required to work in the public sector for some years after graduation, and Malays were the majority of the scholarship holders (Mehmet and Hoong 1985). In parallel, other Chinese and Indians may have decided to work in the private sector because of their qualifications from private higher education institutions. Above all, the institutional frameworks of higher education and labour markets influence the thought processes through which various ethnic groups go. Therefore, it is necessary to set up an empirical strategy to fit the nature of the two hypotheses, to which section 6.3.2 returns.

6.3 Empirical Strategy

6.3.1 Data

The empirical part of this chapter is developed around *Population and Housing Census Malaysia 2000* which includes questions on both type of higher education and sector of employment. This is the first census that collects such information. This fact itself points to the significance of this data set.

The objective of the study is to examine the two hypotheses and illustrate the persistence of the ethnic factor from higher education through to labour markets. For this purpose, the entire sample is manufactured as follows. First, Malaysian citizens born in Malaysia are selected. The focus is on the three major ethnic groups, namely Malays, Chinese and Indians. This allows us to investigate how the domestic population responds to government higher education and labour market policy. Second, the 25 to 49 years age groups are included. What is examined is the active labour force, which has attained higher education. Indeed, individuals are to complete formal education by the age of 24, and the retirement age of women is 50 years old. Third, those reporting the type of higher education (i.e., public, private or overseas) and type of sector (i.e., public or private sectors) are included. For analytical purposes, both private and overseas higher education

are treated altogether since they are substitutes for public higher education (see Chapter 4). Above all, we focus on those with higher educational backgrounds. As a result, the size of the present sample is reduced to 8,408 individuals (see Table 6.1). The ethnic distribution of the sample slightly differs from Chapters 4 and 5, since the present chapter is concerned with higher education graduates only.

Table 6.1 The Sample Distribution by Ethnicity

	Frequency	Percent
Malays	5,165	61.4
Chinese	2,721	32.4
Indians	522	6.2
TOTAL	8,408	100.0

6.3.2 Estimation Strategy

The nature of this empirical study is illustrative. The presence of ethnic effects on sector selection is empirically tested by controlling for other observed variables like educational achievement and gender. Thus, I do not necessarily aim to obtain structural parameters or identify causal relationships. Nor do I intend to find a ‘best-fitted’ econometric model by considering various econometric issues, such as endogeneity. Rather, emphasis is placed upon how the ethnic factor persists from higher education through to labour market decisions.

With this motive in mind, it is necessary to consider the discussion in section 6.2 when setting up an estimation method: it is highly likely that the decisions on higher education enrolment and sector selection are mutually related or likely to be made simultaneously. Here, recall that the public sector plays a key role in terms of graduate unemployment and that the choice of public sector employment is influenced by a vector of variables, such as ethnicity, education achievement, including type of higher education, and gender (see Chapter 5). On the other hand, the decision on higher education enrolment or achievement, or type of higher education achieved in the present context, is affected by a set of variables like ethnicity and gender (see Chapter 4). As such, there is a possible

simultaneous relationship between higher education and labour market decisions, which ought to be taken into account in an empirical framework. Failure to do so may produce biased and inconsistent parameter estimates in an econometric equation (Greene 1996). Thus, I first consider the following selection problem similar to Chapter 5:

$$D_1 \begin{cases} 1 = \text{enrol public higher education institutions, if } Y_1^* > 0 \\ 0 = \text{enrol private/overseas higher education institutions, otherwise} \end{cases}$$

$$D_2 \begin{cases} 1 = \text{work in the public sector, if } Y_2^* > 0 \\ 0 = \text{work in the private sector, otherwise} \end{cases}$$

where Y_1^* and Y_2^* are latent, unobservable variables pertaining to the difference in decisions between public and private higher education institutions and between public and private sector employment. They can be expressed in the following general form:

$$\begin{aligned} Y_1^* &= \alpha_1 X_1 + \varepsilon_1 \\ Y_2^* &= \alpha_2 X_2 + \varepsilon_2 \end{aligned} \tag{6.1}$$

where X is a vector of various explanatory variables and ε_1 and ε_2 are zero-mean, constant-variance error terms:

$$\begin{aligned} E(\varepsilon_1) &= E(\varepsilon_2) = 0 \\ \text{Var}(\varepsilon_1) &= \text{Var}(\varepsilon_2) = 1 \\ \text{Cov}(\varepsilon_1, \varepsilon_2) &= \rho \end{aligned}$$

It must be noted here that equation (6.1) is different to equation (5.1) since, unlike equation (5.1), the sample for D_2 in (6.1) is not censored. Here, Y_2^* is observed regardless of the first-stage choice. More importantly, equation (6.1) needs to be modified to incorporate the possible simultaneous relationship in the Malaysian context. As mentioned above, the decision on sector selection is influenced by various factors such as ethnicity and type of higher education. In

other words, Y_1^* in equation (6.1) influences the decision on Y_2^* . With reference to Greene (1996, 1998, 2003), Grosjean and Kontoleon (2009) and Maddalla (1983), therefore, equation (6.1) is transformed into the following recursive, simultaneous form in order to fit the Malaysian context:

$$\begin{aligned} Y_1 &= \delta_1 X_1 + u_1 && \text{if } Y_1^* > 0 \\ Y_2 &= \phi Y_1 + \delta_2 X_2 + u_2 && \text{if } Y_2^* > 0 \end{aligned} \quad (6.2)$$

where Y_1 enters the decision on employment sector, Y_2 . δ_1 and δ_2 are the parameters of X_1 and X_2 , both of which correspond to a vector of explanatory variables, and u_1 and u_2 are error terms.⁸⁰ Unlike (6.1), the error terms in (6.2) are correlated since the decision on sector of employment is dependent on the decision on type of higher education. The application of ordinary least squares (OLS) to this model yields inconsistent and inefficient estimates, since this is a binary choice problem and also since the error terms are correlated (Greene 2003). Indeed, (6.2) is estimated by full information maximum likelihood (FIML) technique suggested by Greene (1998), which is automatically performed by computer programmes such as NLOGIT.

6.3.3 Variables

The dependent variables are binary, being created from the questions on type of higher education and sector of employment. TYPEHE equals 1 if the respondent attended local public higher education, and it 0 otherwise (namely, either local private or overseas higher education). SECTOREMP equals 1 if the respondent stated that he or she works in the public sector, and it 0 otherwise (namely, the private sector).

Explanatory variables are selected on the basis of the arguments and findings so far as well as the constraints of the present data sets. As pointed out in the previous two chapters, the census data does not contain information on income-related and parental backgrounds. Table 6.2 presents the summary statistics of

⁸⁰ If unobserved heterogeneity exists and factors influencing it are correlated, then the error terms follow a bivariate distribution (see Greene 1996, 1998 for details).

those included in X_1 and/or X_2 in (6.2), together with TYPEHE and SECTOREMP.

Firstly, as seen in Chapter 4, the choice of type of higher education is influenced by ethnicity, gender and birthplace. In light of the ethnic concerns in higher education that are manifested as the ethnic quota system etc, both Chinese (CHINESE) and Indian dummies (INDIANS) are included to investigate the ethnic difference in higher education decision. Further, a female dummy (FEMALE) and four birthplace dummies, namely BORNEO, NORTHERN, SOUTHERN and WESTERN, are included. The reference group in the first equation is Malay men born in either Kuala Lumpur or Selangor. Furthermore, the inclusion of age cohort dummies enables us to capture the effects of policy shifts on selection of type of higher education (see also Chapter 4).

Besides the ethnic and gender dummies together with age, the second equation includes other variables that can influence labour market decisions (see Chapter 5). Local labour market conditions reflect the availability of job opportunities for higher education graduates, and they are proxied by the current residence dummies by state (CRBORNEO CRNORTHERN CRSOUTHERN and CRWESTERN) and by area (SEMIURBAN and RURAL). Here, the state dummies are believed to capture some relevant spatial heterogeneity that is not explained by the area dummies. It can be expected that those residing in less developed areas are employed in the public sector, since private sector jobs tend to be mainly offered in more developed areas. Furthermore, household-related variables available in the present data must be considered since they can impact on employment decisions. From the available information, the dummies indicating head of the household (HEADHH) and marital status (MARRIED) are included to see the effects of household responsibilities on sector selection. Nonetheless, some caution is required in interpreting all these variables, since they may be endogenous variables and thus the outcomes of labour market decisions. Yet, the aim of this empirical study is not econometric but illustrative to confirm the persistence of the ethnic factor from higher education through to labour market decisions. Although such issues as the role of residence and

household responsibilities in influencing labour market decisions are important on their own, therefore, I leave them aside for analytical purposes. I continue to focus on the role of ethnicity in higher education and labour market decisions.

Above all, the two hypotheses developed in the previous section are tested by (i) if the sign of the coefficient on and marginal effect of TYPEHE are positive and statistically significant and (ii) if the estimated signs of the coefficients on and the marginal effects of CHINESE and INDIANS are negative and statistically significant. If (i) is true, then it indicates support for Hypothesis 1 since Malays, being the reference group, are over-represented at public higher education institutions and, therefore, are highly associated with TYPEHE = 1. Similarly, if (ii) is true, then it indicates support for Hypothesis 2.

Table 6.2 Summary Statistics of Variables

<i>Variables</i>	<i>Description</i>	<i>Mean (Std Dev)</i>
Dependent Variables		
TYPEHE	1 if domestic public higher education, 0 otherwise	0.672 (0.469)
SECTOREMP	1 if public sector employment, 0 otherwise	0.413 (0.492)
Ethnicity		
MALAY*	1 if Malay, 0 otherwise	0.614 (0.487)
CHINESE	1 if Chinese, 0 otherwise	0.324 (0.468)
INDIANS	1 if Indian, 0 otherwise	0.062 (0.241)
Gender		
MALE*	1 if male, 0 otherwise	0.580 (0.494)
FEMALE	1 if female, 0 otherwise	0.420 (0.494)
Age Cohort		
25-29*	1 if aged between 25 and 29, 0 otherwise	0.302 (0.459)
30-34	1 if aged between 30 and 34, 0 otherwise	0.261 (0.439)
35-39	1 if aged between 35 and 39, 0 otherwise	0.209 (0.407)
40-44	1 if aged between 40 and 44, 0 otherwise	0.139 (0.346)
45-49	1 if aged between 45 and 49, 0 otherwise	0.088 (0.284)
Birthplace		
NORTHERN*	1 if born in northern states (Kedah, Perlis, Kelantan or Trengganu), 0 otherwise	0.244 (0.430)
BORNEO	1 if born in Borneo states (Sabah, Sarawak or Labuan), 0 otherwise	0.059 (0.235)
SOUTHERN	1 if born in southern states (Johor, Pahang, Melaka or Negri Sembilan), 0 otherwise	0.284 (0.451)
WESTERN	1 if born in western states (Penang or Perak), 0 otherwise	0.220 (0.414)
KLNAGV	1 if born in Klang Valley (Kuala Lumpur or Selangor), 0 otherwise	0.193 (0.395)
Current Residence (State)		
CRKLANGV*	1 if lives in Klang Valley (Kuala Lumpur or Selangor), 0 otherwise	0.491 (0.500)
CRBORNEO	1 if lives in Borneo states (Sabah, Sarawak or Labuan), 0 otherwise	0.069 (0.254)
CRNORTHERN	1 if lives in northern states (Kedah, Perlis, Kelantan or Trengganu), 0 otherwise	0.131 (0.337)
CRSOUTHERN	1 if lives in southern states (Johor, Pahang, Melaka or Negri Sembilan), 0 otherwise	0.187 (0.390)
CRWESTERN	1 if lives in western states (Penang or Perak), 0 otherwise	0.122 (0.327)
Current Residence (Area)		

URBAN*	1 if lives in urban area (with 75,000 persons and above), 0 otherwise	0.722 (0.448)
SEMIURBAN	1 if lives in semiturban area (with 1,000-74,999 persons), 0 otherwise	0.169 (0.374)
RURAL	1 if lives in rural area (with less than 999 persons), 0 otherwise	0.109 (0.312)
Household		
HHMEMBERS*	1 if members of the household, 0 otherwise	0.502 (0.500)
HEADHH	1 if head of the household, 0 otherwise	0.498 (0.500)
Marital Status		
NOTMARRIED*	1 if not married, 0 otherwise	0.245 (0.430)
MARRIED	1 if married, 0 otherwise	0.755 (0.430)

Note: * indicates the reference group.

6.4 Empirical Results

6.4.1 Descriptive Results

Before engaging in econometric analysis, it is useful to present some descriptive findings. Table 6.3 presents the association between type of higher education and sector of employment. Three points are immediately found. First, those enrolling in public higher education institutions are more likely to work in the public sector. In contrast, the majority of those having attained private or overseas higher education are employed in the private sector. Second, as can be computed from the table, around 90 percent of the public sector workers have attained public higher education. In contrast, when it comes to those engaged in private sector employment, those with public and private/overseas education are equi-proportionately represented. The Pearson and likelihood ratio tests reject the null hypothesis that type of higher education and sector of employment are independent to each other. This suggests that the two decisions are related to each other, indicating that type of higher education influences sector selection.

Table 6.3 Public-Private Choice in Higher Education and Sector of Employment

<i>Type of Higher Education</i>	Sector of Employment		Total
	Public	Private	
Public	3,141 (55.6)	2,513 (44.4)	5,654 (100.0)
Private/Overseas	335 (12.2)	2,419 (87.8)	2,754 (100.0)
Total	3,476 (41.3)	4,932 (58.7)	8,408 (100.0)

Chi-square	DF	Value	Probability
Pearson	1	1.4e+03	.000
Likelihood Ratio	1	1.6e+03	.000

Those findings are significant on their own, but must be further scrutinized in relation to ethnicity. When looking at the ethnic distribution of those having completed public higher education in this sample, it is found that Malays account for 76.1 percent, Chinese 18.9 percent and Indians 5 percent. It indicates the

Malay dominance in public higher education since its share is larger than the population share, 61.4 percent (see Table 6.1). Findings from Table 6.4 supplement these points. First, the strong association between Malays and public higher education is found. More than 80 percent of Malays chose public higher education. On the other hand, the Chinese choice of private or overseas over public education is apparent. Indians are in-between Malays and Chinese but are closer to the latter. More than half of Indians chose public higher education, but their proportion is much lower than the overall proportion of 67.2 percent (see the last row). Compared to Malays, therefore, it can be argued that Chinese and Indians opt for private or overseas higher education. Furthermore, it is also found that women tend to choose public higher education more than men, irrespective of ethnic groups. The total share of women having attended public higher education institutions is 71.3 percent, which is higher than 64.3 percent of men (see the last row). The same tendency holds with all the three ethnic groups.

Table 6.4 Ethnicity, Gender and Type of Higher Education

		Public	Private and Overseas			Total
			Sub-total	Local private	Overseas	
Malay	Male	80.5	19.5	5.7	13.8	100.0
	Female	87.1	12.9	4.6	8.3	100.0
	Sub-Total	83.3	16.7	5.2	11.5	100.0
Chinese	Male	36.2	63.8	36.5	27.3	100.0
	Female	43.5	56.5	38.6	17.9	100.0
	Sub-Total	39.3	60.7	37.4	23.3	100.0
Indians	Male	48.4	51.6	31.3	20.3	100.0
	Female	63.6	36.4	22.3	14.1	100.0
	Sub-Total	54.4	45.6	27.8	17.8	100.0
Total	Male	64.3	35.7	17.2	18.5	100.0
	Female	71.3	28.7	16.9	11.8	100.0
	Grand Total	67.2	32.8	17.1	15.7	100.0

Turning to public-private choice in sector selection, Table 6.5 shows that Malays are more likely to work in the public sector whereas Chinese and Indians the private sector. Besides the findings from Table 6.4, this finding corroborates the two hypotheses established earlier. For example, more than half of Malays work in the public sector, but the proportions for Chinese and Indians are just

16.2 percent and 29.1 percent. Similar to higher education decision, Indians are situated in between Malays and Chinese. And interestingly, it is also found that women chose public sector employment more than men, regardless of ethnic backgrounds. Above all, all the findings from Tables 6.3, 6.4 and 6.5 indicate that the two hypotheses developed in section 6.3.2 seem to be true.

Table 6.5 Ethnicity, Gender and Sector of Employment

		Sector of Employment		Total
		Public	Private	
Malay	Male	48.1	51.9	100.0
	Female	66.5	33.5	100.0
	Sub-total	55.8	44.2	100.0
Chinese	Male	9.7	90.3	100.0
	Female	24.8	75.2	100.0
	Sub-total	16.2	83.8	100.0
Indians	Male	19.3	80.7	100.0
	Female	44.2	55.8	100.0
	Sub-total	29.1	70.9	100.0
Total	Male	34.0	66.0	100.0
	Female	51.4	48.6	100.0
	Grand Total	41.3	58.7	100.0

6.4.2 Estimation Results

Given the descriptive findings, equation (6.2) was estimated to further investigate the effects of the ethnic factor on higher education and labour market decisions. The results are presented in Table 6.6. As expected, it is discerned that higher education and labour market decisions are correlated. The log-likelihood test rejects at 1 percent level of significance the null hypothesis that ρ (rho) equals zero. It indicates that the two decisions are made simultaneously, and provides support for using a recursive bivariate probit technique.

The estimation results for the first TYPEHE equation support the arguments in Chapter 4. Firstly, it is seen that Malays and women are more likely to choose public higher education. In contrast, the negative signs on the coefficients of CHINESE and INDIANS suggest that Chinese and Indians are more likely to choose private/overseas higher education. These findings are consistent with

Chapter 4, and also with Aihara (2009) who found the over-representation of Malays at public higher education institutions and that of Chinese and Indian students at private higher education institutions. Secondly, the age cohort dummies roughly suggest that the older the individual the more likely he or she is to choose public higher education, which reflects that private sector involvement in higher education was not allowed during the NEP period (see Chapter 4).

Lastly, the coefficients on birthplace dummies demonstrate that those born in Kuala Lumpur or Selangor are least likely to enrol in public higher education institutions. In contrast, those from northern states are most likely to do so. Above all, it is indicated that private/overseas higher education is chosen by those from more developed states. These results are not so surprising, since those from developed states such as Selangor may afford and have nearer access to private or overseas higher education. For example, Lee (1999) points out that more or less half of the private higher education institutions were concentrated in Kuala Lumpur or Selangor area. That being the case, students from the urban areas, most likely Chinese, have the advantage of entering these institutions.

Turning to the second SECTOREMP equation, we see the results consistent with Chapter 5. Here, three points deserve special attention. First, the coefficient on TYPEHE is significant and its magnitude is largest in the SECTOREMP equation. This means that having attained public higher education increases the likelihood of working in the public sector. Besides the findings on the Malay dominance at public higher education institutions, it follows that Malay graduates are most likely to go into the public sector with all other things being equal. This is consistent with the finding in Chapter 5, and indicates support for Hypothesis 1. Second, the signs of the coefficients on CHINESE and INDIANS are negative, but the coefficient on INDIANS is statistically insignificant. This means that being Indian does not necessarily influence the choice of public sector employment. Nonetheless, it can be argued that Hypothesis 2 is not rejected.

Finally, it is indicated from the coefficient on FEMALE that women with higher educational backgrounds are more likely to choose the public sector than their male counterparts. Since the reference group is Malays, this suggests that

Malay female graduates are most likely to choose public sector employment, conditional on all other things. This finding is consistent with Chapter 5, and one of the reasons is presumably that public education and health services provide them with job opportunities.

The two hypotheses established in section 6.3.2 ought to be tested further. The raw coefficients presented in Table 6.6 do not necessarily tell actual effects of the explanatory variables on choosing public sector employment, particularly because the form of the estimated equation is recursive (Greene 1996, 1998, 2003; Grosjean and Kontoleon 2008; Long and Freese 2006). Indeed, the variables of my concern produce both direct and indirect effects on the choice of public sector employment. Consider ethnicity. Since the ethnic dummies like CHINESE and INDIANS enter the SECTOREMP equation, they produce direct effects. In parallel, they also appear in the TYPEHE equation, and, therefore, affect the possibility that Y_1 in equation (6.2) equals one. This corresponds to indirect effects, since the effects of ethnicity are transmitted to Y_2 through this indirect channel. Hence, it is necessary to decompose the total marginal effects of the variables that appear in both equations into direct and indirect marginal effects. This is done with reference to Christofides, Stengos and Swindinsky (1997) and Greene (1996, 1998).⁸¹ Since all the variables are dummies, the marginal effects of the variable x on the probability of choosing public sector employment can be computed by $E[Y_2 | X_1, X_2, x=1] - E[Y_2 | X_1, X_2, x=0]$ (see Greene 1996 for details). Table 6.7 presents the results for $E[Y_2 | Y_1 = 1]$, namely the conditional probability on the choice of public sector employment.⁸² Note that the numbers in Table 6.7 are computed from the marginal effects, not from the parameters of Table 6.6.

First of all, the results confirm the simultaneity relationship between type of higher education (TYPEHE) and sector selection (SECTOREMP) decisions, as is

⁸¹ The standard errors for this are computed by the delta method (see Greene 1998, 2003 for the details).

⁸² Although STATA has a command for a recursive bivariate probit model, it does not have a command for decomposing the total marginal effects. In contrast, NLOGIT (or LIMDEP) does the decomposition by MARGINAL command.

obvious from the marginal effect of the type of higher education (TYPEHE). The estimated marginal effect is statistically significant, and TYPEHE exerts the most substantial positive effect on the choice of public sector employment. This finding on TYPEHE indicates that enrolment at public higher education institutions is strongly related to public sector employment, and also that the future sector of employment can be determined by type of higher education selected. Since the majority of graduates from public higher education institutions are Malays, it can also be argued that a large number of Malays enter public sector employment after graduation. This is consistent with the finding in Chapter 5, and provides support for Hypothesis 1. Obviously, government higher education and labour market policies create the institutional environment in which Malays are over-represented in public higher education institutions and then public sector employment.

We can also discern the persistence of the ethnic factor from higher education through to labour markets from the marginal effects of CHINESE and INDIANS. Their signs are negative and statistically significant, supporting Hypothesis 2. Turning to the direct and indirect effects, it is seen that there are clear direct effects of being Chinese or Indians in labour markets: being Chinese or Indians directly reduces the probability of working in the public sector. This indicates that, regardless of type of higher education attained, they tend not to work in the public sector. And very interestingly, most of the effects of being Chinese or Indians come from the indirect effects, as opposed to the direct effects. This means that their labour market decisions are to a large extent determined by their preceding decisions on type of higher education. Put differently, many Chinese and Indians seem to choose private higher education with private sector employment in mind. Obviously, the fundamental reason for this is that the institutional frameworks of higher education and labour markets set structural conditions and constraints they ought to consider when making decisions. Government's higher education and labour market policies influence the thought processes through which Chinese and Indians go, and, consequently, divert many of them away from public higher education and then public sector employment.

Besides the ethnic differentials, the estimation results also show the gender effect. The estimated marginal effect of FEMALE points to the presence of the gender differences in higher education and labour market decisions, and demonstrates that women are more associated with public sector employment than men. Further, almost all the effect of being female stems from the direct effect. This indicates that women do not necessarily make labour market decisions when deciding type of higher education. Rather, it can be argued that, whatever type of higher education attained, women are more likely to go into the public sector. This means a strong association between women and public sector employment. The possible reason for this is that the public sector offers more stable jobs with better fringe benefits, which are not necessarily influenced by economic cycles (see Chapter 5). Nonetheless, the question of why women are more likely to go into the public sector has to be investigated comprehensively in future, since they are now more likely to enrol higher education than men (see Chapter 4).

Turning to the effects of age cohort, it is seen that the older the individual the more likely he or she is to choose public sector employment. Also, most of the marginal effects are found in the direct rather than indirect effects. To some extent, this indicates that the older individuals prefer stable public sector jobs or that the public sector during the NEP period (35-39, 40-44, and 45-49) had absorbed a larger proportion of higher education graduates, as opposed to the post-NEP period (25-29 and 30-34). Nonetheless, this does not mean that the role of the public sector in providing higher education graduates with job opportunities is no longer influential. Rather, those with higher education backgrounds remain associated with public sector employment (see Chapter 5). Therefore, one possible explanation is that higher education has expanded more quickly than the absorptive capacity of the public sector. Together with the earlier findings on ethnic differentials, it could be the structural reason for why graduate unemployment is concentrated amongst Malays.

Lastly, there are effects of other factors such as birthplace, current residence, household and marital status (see also sections 5.4.2 and 5.4.3). As mentioned earlier, however, some caution is required when interpreting the results. These

variables are likely to be endogenous, indicating that they may not necessarily be the causal factors of choosing public sector employment. Though this is a crucial issue on its own and carries some implications, I leave this aside for analytical purposes. Indeed, the roles of these factors on labour market decisions ought to be investigated in future research, so that the rest of this section looks at the estimated results and offers some tentative explanations.

First, the signs of the four birthplace dummies are all positive, and the marginal effect of being born in BORNEO is statistically insignificant. It is seen that those born in the most developed states (KLANGV) are least likely to work in the public sector, and that those from less developed northern states are most likely to do so. Nonetheless, all the magnitudes on the birthplace dummies are negligible, which shows that they do not exert strong influence on the choice of public sector employment.

Second, the positive effect of marriage (MARRIED) and the negative effect of being the head of household are found, whereas their marginal effects are negligible. A tentative explanation for MARRIED can be that the job security and favourable fringe benefits in the public sector attract married individuals. Yet, the reason for the result on HEADHH remains unknown. As mentioned in Chapter 5, the roles of these factors in labour market decisions need to be examined in future.

Finally, the effects of current residence dummies corroborate the finding that the public sector provides job opportunities in semi-urban (SEMIURBAN) and rural areas (RURAL) as well as less developed states such as CRBORNEO and CRNORTHERN (see also Chapter 5). On the other hand, the effects of living in more developed states such as CRSOUTHERN and CRWESTERN on the probability of working the public sector are not as large as CRBORNEO and CRNORTHERN. This is hardly surprising since numerous private sector jobs tend to be concentrated in these developed areas (see also Chapter 5).

As mentioned earlier, however, the interpretation of these current residence variables must be done with some caution. This is because they may be the

consequences rather than causes of the choice of public sector employment. Put another way, some of the individuals live in less developed states or rural areas because they work for the government. Further, when comparing current residence and birthplace, there emerge additional questions on the causal relationship between migration and labour market decisions, which should be addressed in future research. For example, one preliminary study on the 1960s and 1970s suggested that there were frequent job transfers in the public sector, influencing migration activities of the employees with higher educational backgrounds (Menon 1987). That being the case in the 1990s, it would cause a problem of endogeneity in econometric analysis since the majority of public sector employees are Malays. Also, there is another possible problem of endogeneity: many Chinese and Indians may have chosen private higher education with the intention of working in the private sector, and, therefore, moved to the city where there are more private sector jobs. Both of these arguments are interesting stories, but beyond the main purpose of the present study. Also, the present data sets do not allow us to identify the causal relationship since no information on work history and reasons for migration is available. Nonetheless, these arguments do not necessarily deny the finding that the ethnic factor plays an important role in higher education and labour market decisions.

Most crucially, this empirical study has revealed that the ethnic factor is influential in higher education and labour market decisions. The two hypotheses developed in section 6.3.2 are supported econometrically, together with the descriptive findings in section 6.4.1. Above all, Malays are more likely to choose public higher education and public sector employment, whereas Chinese and Indians private higher education and private sector employment. Unlike human capital theory, the political-economic arguments developed in Chapters 4 and 5 enable us to explain why and how this happens. Government's higher education and labour market policies, which are influenced by inter-ethnic (equity) concerns, constructed the institutional framework under which various ethnic groups made higher education and labour market decisions differently. Put it further, they are the fundamental cause of graduate unemployment that is concentrated amongst Malays.

Table 6.6 Result of Recursive Bivariate Probit Equations: Coefficient Estimates

	Coef.	Std Er.
<i>TYPEHE equation: TYPEHE = 1</i>		
Constant	0.504***	0.047
<i>Ethnicity</i>		
CHINESE	-1.160***	0.034
INDIANS	-0.753***	0.061
<i>Gender</i>		
FEMALE	0.259***	0.032
<i>Age Cohort</i>		
30-34	0.109*	0.042
35-39	0.056	0.044
40-44	0.143***	0.050
45-49	0.139**	0.057
<i>Birthplace</i>		
BORNEO	0.095	0.069
NORTHERN	0.492***	0.049
SOUTHERN	0.288***	0.043
WESTERN	0.249***	0.045
<i>SECTOREMP equation: SECTOREMP = 1</i>		
Constant	-2.467***	0.085
TYPEHE	1.809***	0.135
<i>Ethnicity</i>		
CHINESE	-0.319***	0.101
INDIANS	-0.035	0.085
<i>Gender</i>		
FEMALE	0.469***	0.054
<i>Age Cohort</i>		
30-34	0.253***	0.047
35-39	0.439***	0.051
40-44	0.653***	0.061
45-49	0.815***	0.071
<i>Current Residence (State)</i>		
CRBORNEO	0.930***	0.070
CRNORTHERN	0.595***	0.057
CRSOUTHERN	0.472***	0.046
CRWESTERN	0.363***	0.053
<i>Current Residence (Area)</i>		
SEMIURBAN	0.398***	0.044
RURAL	0.681***	0.058
<i>Household</i>		
HEADHH	-0.103**	0.045
<i>Marital Status</i>		
MARRIED	0.208***	0.041
Rho	-0.588***	0.098
No. of Sample: 8,408		

Note: Log likelihood = -8281.024; *** 1%, ** 5%, * 10% levels of significance respectively.

Table 6.7 Decomposition of Marginal Effects

	Marginal Effects			
	Direct	Indirect	Total	Std Er.
TYPEHE	0.649		0.649**	0.070
<i>Ethnicity</i>				
CHINESE	-0.114	-0.139	-0.254**	0.018
INDIANS	-0.013	-0.091	-0.103**	0.024
<i>Gender</i>				
FEMALE	0.169	0.031	0.200**	0.018
<i>Age Cohort</i>				
30-34	0.091	0.013	0.104**	0.016
35-39	0.158	0.007	0.164**	0.018
40-44	0.234	0.017	0.252**	0.021
45-49	0.293	0.017	0.309**	0.025
<i>Birthplace</i>				
BORNEO		0.011	0.011	0.013
NORTHERN		0.059	0.059**	0.006
SOUTHERN		0.035	0.035**	0.006
WESTERN		0.030	0.030**	0.008
<i>Current Residence (State)</i>				
CRBORNEO	0.334		0.334**	0.026
CRNORTHERN	0.213		0.213**	0.022
CRSOUTHERN	0.169		0.169**	0.018
CRWESTERN	0.130		0.130**	0.020
<i>Current Residence (Area)</i>				
SEMIURBAN	0.143		0.143**	0.017
RURAL	0.244		0.244**	0.022
<i>Household</i>				
HEADHH	-0.037		-0.037*	0.017
<i>Marital Status</i>				
MARRIED	0.075		0.075**	0.015

Note: ** denotes 1%, * 5% levels of significance respectively.

6.5 Conclusions

Higher education and labour market policies in Malaysia have reflected the national priority of achieving inter-ethnic distribution with economic growth, and they have defined the institutional frameworks of higher education and labour markets, under which various structural conditions and constraints are put into place. Put another way, they lay the foundation on which the ethnic factor continues to play a key role from higher education through to labour market decisions. Indeed, the empirical findings of this chapter show that various ethnic

groups respond to the policies in different ways. Malays are more likely to enrol in public higher education institutions and then work in the public sector, whereas Chinese and Indians private/overseas higher education institutions and then the private sector. Crucially, it was also indicated that there is a simultaneous relationship between higher education and labour market decisions. In particular, Chinese and Indians seem to decide on type of higher education with future employment in mind. Above all, the findings in this chapter reinforce the earlier argument that the reason why graduate unemployment is concentrated amongst Malays lies in the institutional frameworks set out by the government.

At analytical level, all these findings enhance the need for a constructive assessment of both higher education and labour markets when addressing issues like graduate unemployment. By the same token, they also confirm the significance of examining the historical and institutional contexts in which higher education is provided and labour markets are structured. This obviously means that the question of how higher education and labour markets work in Malaysia is unable to be addressed adequately by human capital theory. In order to set the ground on which appropriate understanding of higher education and labour markets is obtained and thus adequate policies are considered, therefore, the political economy approach that places the role of government at the analytical centre is required.

Chapter 7

Concluding Remarks

As Chapters 2 and 3 demonstrated, human capital theory has serious analytical deficiencies in the study of (higher) education and labour markets. In a sense, these deficiencies are inescapable. Built upon a neoclassical framework, human capital theory treats how (higher) education is provided and how labour markets are structured as black boxes. It ignores or disconnects the historical and institutional contexts from its analysis, so that reliance upon the theory determines what can be explained and what cannot.

Application of human capital theory to the Malaysian case has some insights to offer by revealing the statistical significance of factors like ethnicity in education and labour markets. They are significant on their own, but turn out to be inadequate when the analytical priority is to account for why and how ethnicity is significant in the context of Malaysia. Indeed, the applied studies follow Mincerian earnings function and, therefore, reduce the contexts around ethnicity to parameter estimates in the estimated equations. To the extent that analysis is based on human capital theory, therefore, the understanding of Malaysia's higher education and labour markets remains limited.

The inadequate understanding of what is happening in reality causes a number of problems. Practically, it suggests that policy implications derived from human capital theory are questionable. It is particularly so if the issues of concern are to explain why graduate unemployment is concentrated amongst Malays and to consider appropriate policies. The original human capital theory itself contributes very little to explaining the causes of graduate unemployment, since it presumes full employment. Despite so, those who are wedded to the theory and familiar with modifying it would provide some explanation. Let me take one example. In pursuit of the causes of graduate unemployment, the proponents of human capital theory may argue that the low productivity level of unemployed Malays make it difficult for them to find jobs. If so, the quality of public higher education

services will be questioned, and, accordingly, it can justify increased government expenditure for public higher education and/or streamline current expenditure to meet objectives such as improved quality.

Apparently, the government of Malaysia follows this line of explanation. One typical example is the medium of instruction at public higher education institutions. It is reported that there are gaps in English proficiency between public and private university students (Pandian 2008), and there is a growing recognition of the importance of English fluency in job markets (Pandian and Ghani 2005). Consequently, the use of Bahasa Malaysia at public higher education institutions has been reviewed, and the medium of instruction in science and technology subjects has been switched to English gradually over recent years (Aihara 2009).

By the same token, curriculum development has also been emphasised to match the changing economic demands. For example, Awang and Rugayah (2008) recently conducted a survey of 139 manufacturing firms in Malaysia, and argued that various skills of Malaysian graduates do not necessarily match employers' expectations. They suggested a comprehensive review and update of the curricula at higher education institutions in order to enhance 'employability' of Malaysian graduates. Along similar lines, Yunus (2008) suggested the introduction of various courses at higher education institutions to enhance communication and problem-solving skills of graduates. Indeed, Malaysia (2006, p. 257) argued that higher education institutions "will design their academic programmes and develop their curricula based on market requirement to ensure the employability of graduates. These programmes will be implemented with greater collaboration and active support from industry and employer associations."

Certainly, it is one important thing to highlight the significance of English fluency and curriculum development in improving job market prospects of graduates. Further, improvement in many other aspects of higher education, such as quality of teaching, may be raised. No one can deny all this *per se*. However, it is another to point out that these arguments implicitly presume that graduates,

either Malays or Chinese, face the same labour markets. Is it true? As this study showed, it is not really the case. Furthermore, how can we assess the productivity level of unemployed people? According to human capital theory, productivity is judged in the workplace when individuals produce economic output (see also section 2.2.1). Since the unemployed are obviously not working, their productivity levels remain unknown. Or, can their productivities be judged by their learning outcomes? Not necessarily.

Above all, it is important to understand the analytical limitations of the theory on which those explanations are based. Since human capital theory leaves aside the contexts of how (higher) education is provided and how labour markets are structured, it offers little to identify the fundamental cause of graduate unemployment. In the above example, many Malay graduates are unemployed not necessarily because they are competing with Chinese and Indian graduates to take private sector jobs requiring good English skills but because they may be queuing for public sector jobs. If this is the case, the jobs that the unemployed Malay graduates are looking for may not necessarily require good English skills. The question of why Malays prefer public sector employment, rather than of why the productivity level of the unemployed Malays is low, ought to be addressed first. Or alternatively, many Malay graduates may be unemployed due to a combination of the two reasons. Here, I do not intend to judge which reason is true. But it must be emphasised that, when looking for reasons of graduate unemployment, we need to identify its fundamental cause by understanding the contexts of how higher education is provided and how labour markets are structured. Needless to say, human capital theory offers little guidance in doing so.

I do not aim to present specific higher education and/or labour market policies to solve the problem of graduate unemployment. Rather, my main aim is to suggest that it is essential to understand, with reference to ethnicity, how higher education and labour markets in Malaysia work. Failure to do so makes it difficult to identify the fundamental cause of graduate unemployment, and, therefore, no foundation upon which appropriate policies are mooted is derived (see section 1.1.3). Indeed, there can be many reasons for graduate

unemployment other than weak command of English and outdated curricula, such as the lack of communication skills and information technology skills and inappropriate job market information (*New Straits Times*, 12 July 2006). Since the content of 'human capital' is variable (see section 2.2.1), the number of reasons can be many. In order to understand why lack of those skills plays a negative role in labour markets, however, it is of utmost importance to specify where the fundamental cause of graduate unemployment resides rather than to list as many potential reasons for graduate unemployment as possible. For this purpose, a comprehensive analysis of both higher education and labour markets with reference to ethnicity is required.

In this regard, this study provides a constructive assessment of Malaysia's higher education and labour markets by taking the political economy approach that sets the role of government at the analytical centre. As Chapters 4 to 6 demonstrated, the institutional frameworks of higher education and labour markets are constructed on the ground of the trade-off between economic growth (efficiency) and inter-ethnic distribution (equity). They are justified, at least by the government, for maintaining social stability in the multi-ethnic country. Our arguments and empirical findings, which are briefly summarised below, lend themselves to suggesting that the fundamental cause of graduate unemployment lies in the institutional framework set up by government.

As far as higher education is concerned, policy focus is to make sure that the ethnic distribution of higher education enrollees reflects the population distribution. For this purpose, the ethnic quota system at public higher education institutions was put in place, and the way in which higher education is provided is controlled by government. Though higher education reforms were introduced from the mid-1990s, they were done so in accordance with the existing institutional environment. Naturally, Malays were over-represented at public higher education institutions, but, when bringing all types of higher education together, the Malay advantage in enrolling higher education disappears. Equally, the Chinese started to outstrip Malays in terms of the probability of entering higher education institutions from the 1990s, but Indians continued to lag behind Malays. As is shown in Chapter 6, the main reason for the changing trend of

Chinese enrolment was that they started to choose private higher education institutions, which became widely available with the introduction of the higher education reforms.

The fundamental concern in labour markets is to strike a balance between economic growth and inter-ethnic distribution. It is so because Malaysia needs to maintain the win-win principle by distributing the economic pie that the private sector is expected to grow. For this purpose, the public sector is geared towards employing Malays, whereas the private sector is expected to pump up economic growth. Quite naturally, this has influenced labour market decisions of various ethnic groups. As seen in Chapter 5, Malay graduates are most likely to go into the public sector, but Chinese and Indians graduates tend to choose private sector employment. Further, Chapter 6 indicated that Chinese and Indians seem to choose private higher education with future private sector employment in mind. This simultaneous relationship between higher education and labour market decisions was the natural consequence of government's higher education and labour market policies.

All this clearly demonstrates that the role of government is of paramount importance in the study of Malaysia's higher education and labour markets. Government higher education and labour market policies, which reflect the underlying efficiency-equity trade-off, have influenced the thought processes of various ethnic groups. Consequently, Malays are more likely to enrol at public higher education institutions and then work in the public sector. In contrast, Chinese and Indians tend to choose private higher education institutions and then work in the private sector. Since the capacity of the public sector in terms of employment absorption is limited relative to the private sector, it is likely that many Malay graduates are queuing for public sector employment. This provides support for the argument that the fundamental cause of graduate unemployment resides in the institutional frameworks of higher education and labour markets, which are established by government.

The novelty of this study resides in two main areas. First, this study critically appraises human capital theory originating with Jacob Mincer. Through a wide

and critical review of the theory and applied studies, it points out its analytical deficiencies in the study of (higher) education and labour markets. These theoretical arguments can be applied to other developing countries in future research. Second, it is the first comprehensive attempt to look into the ethnic factor in both higher education and labour markets in Malaysia in the 1990s. There are only a few studies that have attempted to do so, but they focused only on the pre-1990s. In contrast, this study examined the 1990s, when Malaysia went through important changes, particularly in the area of higher education. The causes of ethnic differentials in higher education enrolment and sector selection were comprehensively examined with a political economy approach. This marks a break with the past in which a number of researchers studied either higher education enrolment or sector selection in labour markets. Equally importantly, previous findings on these issues are based on inadequate quantitative findings. Instead, this study employs the two-percent random sample of the *Population and Housing Census Malaysia 2000*, which are representative data, and illustrates the realities of Malaysia's higher education and labour markets.

Empirical analysis using the census data also provides a number of important future research topics in related fields. For example, the role of gender in higher education enrolment has to be investigated comprehensively, since, as Chapter 4 found, women are now more likely to enrol higher education. Further, the lack of household-level information, such as parental education and occupation as well as household income, does not allow us to investigate the effects of family backgrounds on higher education enrolment (see Chapter 4). This point has to be investigated in further research, possibly with household-level data sets. Similarly, the relationship between household responsibilities, including marital status, and labour market decisions has to be investigated comprehensively (see Chapters 5-6). The relationship between place of residence and labour market decisions is also an important research topic, but this issue may require panel data sets which contain not only household-level information but also work and migration history of individuals.

Having investigated the ethnic factor in higher education and labour markets, this study provides the foundation on which future higher education and labour

market policies are considered. When formulating policy, it is essential to understand reality first. When addressing higher education and labour markets in Malaysia, it is very important to place the role of government at the analytical centre.

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Appendix

Appendix A

**** Hausman tests of IIA assumption

Ho: Odds (Outcome-J vs Outcome-K) are independent of other alternatives.

Omitted	chi2	df	P>chi2	evidence
NOT WORKING	-578.271	40	1.000	for Ho
SELF EMPLOYED	-2.4e+03	40	1.000	for Ho
PUBLIC SECTOR	-1.1e+03	40	1.000	for Ho

**** Small-Hsiao tests of IIA assumption

Ho: Odds (Outcome-J vs Outcome-K) are independent of other alternatives.

Omitted	lnL(full)	lnL(omit)	chi2	df	P>chi2	evidence
NOT WORKING	-3.26e+04	-3.25e+04	60.162	20	0.000	against Ho
SELF EMPLOYED	-3.20e+04	-3.19e+04	74.491	20	0.000	against Ho
PUBLIC SECTOR	-3.83e+04	-3.83e+04	77.383	20	0.000	against Ho

Appendix B

The Profiles of the Unemployed: Ethnicity and Educational Background

	None/ Primary	Lower Sec	Upper Sec	Post Sec	Higher	Total
Malays	27.6	25.8	34.6	4.0	8.0	100.0
Chinese	35.9	25.9	28.0	2.3	7.9	100.0
Indians	37.1	27.7	23.5	5.9	5.9	100.0

Appendix C

The Profiles of the Unemployed: Ethnicity and Age Cohort

	25-29	30-34	35-39	40-44	45-49	Total
Malays	47.9	20.3	13.1	11.4	7.3	100.0
Chinese	39.5	21.6	16.4	12.6	9.8	100.0
Indians	31.2	20.0	15.9	18.8	14.1	100.0